YANKEE GULCH JOINT VENTURE ET AL.
(Respondent)

v.

BUREAU OF LAND MANAGEMENT
(Appellant)

IBLA 88-130 Decided February 14, 1990

Appeal from a decision of Administrative Law Judge Harvey C. Sweitzer finding the applicants for sodium preference right leases C-0118328, C-0118329, and C-0120057 entitled to leases.

Affirmed.

1. Administrative Procedure: Burden of Proof--Appeals: Generally--Evidence: Burden of Proof--Evidence: Weight--Rules of Practice: Appeals: Burden of Proof--Rules of Practice: Hearings

When a hearing is held pursuant to 43 CFR 3563.4(c), affording a sodium preference right lease applicant an opportunity to demonstrate entitlement, the applicant has both the burden of going forward and the ultimate burden of proof of showing that a valuable sodium deposit has been discovered. If there is an appeal from the Administrative Law Judge decision following the hearing, the appealing party has the burden of showing error in the Administrative Law Judge's decision.

2. Mineral Leasing Act: Generally--Sodium Leases and Permits: Leases--Sodium Leases and Permits: Permits--Sodium Leases and Permits: Preference Right Leases

To establish the discovery of a valuable deposit of sodium, a preference right lease applicant must show the existence of a mineral deposit within the permit area of such quality and quantity that a person of ordinary prudence would be justified in the further expenditure of his labor and means with a reasonable prospect of success in developing a paying mine. This test is almost identical to the objective standard for determining whether a person locating a claim under the 1872 Mining Law (30 U.S.C. § 21 (1982)) has perfected his claim by the discovery of valuable mineral. The "marketability

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test" is also applied to determine if there is a reasonable prospect for developing a "paying mine." This requires a showing of a reasonable prospect that the "valuable mineral" can be extracted, removed, and marketed at a profit.

3. Mineral Leasing Act: Generally--Sodium Leases and Permits: Leases--Sodium Leases and Permits: Permits--Sodium Leases and Permits: Preference Right Leases

The "prudent person" and "marketability" tests require a showing that as a present fact (considering historic price and cost factors and assuming those factors will continue) there is a reasonable likelihood that a paying mine can be developed. Actual successful exploitation need not be shown, and a preference right lease applicant is not required to show that mineral of sufficient quantity and quality has been exposed to demonstrate that a profitable mining operation can be developed. He need only show, based upon the mineralization exposed and reasonable geologic and market projections, that a person of ordinary prudence would expend further labor and means with the reasonable expectation that a profitable mine will thereby be developed.

4. Mineral Leasing Act: Generally--Sodium Leases and Permits: Leases--Sodium Leases and Permits: Permits--Sodium Leases and Permits: Preference Right Leases

If at any time during mineral exploration, it is deemed prudent to commence development, the initiation of development activities is justified, even though further exploration may be warranted. However, if not enough is known about either the size or quality of the mineralization to justify commencing development, and it would be possible to have a paying mine if the size of the mineralized body or value of the mineral could be increased, further exploration is warranted. A determination that further exploration is warranted is not sufficient to establish the discovery of a valuable deposit of a mineral.

There is a clear distinction between "exploration" and "development" as those terms relate to discovery under the mining laws. The separate stages of mining activity serve as a basis for determining what further mining activity a prudent man would be justified in undertaking. Exploration work is that work which is undertaken to determine whether valuable minerals exist in sufficient quality and quantity that there is a reasonable prospect that a paying mine could be developed. Development work is undertaken only after this determination

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has been made. A preference right lease applicant must show that a discovery either existed or could reasonably have been anticipated prior to the expiration of the prospecting permits.

5. Mineral Leasing Act: Generally--Sodium Leases and Permits: Leases--Sodium Leases and Permits: Permits--Sodium Leases and Permits: Preference Right Leases

When further exploration work would not materially increase the reasonably projected quantity or quality of the sodium deposit a discovery determination must be based on the showing that there is a reasonable prospect that the deposit can be mined, processed, and marketed at a profit. This determination must be made as of the date the preference right lease applicant fulfilled all the prerequisites for determining entitlement to a preference right lease. Thus evidence concerning subsequent costs and market conditions have relevance only to the extent they reflect what may reasonably have been anticipated at the expiration of the prospecting permits. When making a final showing, the applicants must also show that there is a reasonable probability that the mineralization can be mined in a manner which will be in compliance with the proposed lease terms.

6. Evidence: Generally--Evidence: Sufficiency--Evidence: Weight--Rules of Practice: Evidence

The Board has full authority to reverse findings of fact made by an Administrative Law Judge. However, when the resolution of disputed facts is influenced by the Judge's findings of credibility, which are in turn based upon the Judge's reaction to the demeanor of the witnesses, and such findings are supported by substantial evidence, they ordinarily will not be disturbed by the Board. The basis for this deference is the fact that the Judge who presides over a hearing has the opportunity to observe the witnesses and is in the best position to judge the weight to be given to conflicting testimony.

7. Mineral Leasing Act: Generally--Sodium Leases and Permits: Leases--Sodium Leases and Permits: Permits--Sodium Leases and Permits: Preference Right Leases

When determining whether it can reasonably be expected that a preference right lease applicant would be able to profitably market the leased products, given the costs of mining the deposit and producing the products, it is not necessary to know the exact cost of production or

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the exact price which might be received. This determination may be based upon a reasonable and rational estimate of the cost of production and a reasonable and rational estimate of the market price for the product.

8. Mineral Leasing Act: Generally--Sodium Leases and Permits: Leases--Sodium Leases and Permits: Permits--Sodium Leases and Permits: Preference Right Leases

It is reasonable to expect that during the course of mine development the operator will find it necessary to modify and further refine its mining plan. Thus, it is improper for BLM to reject an application because the data submitted by the preference right lease applicant was not sufficiently specific to form the basis for an assurance that a paying mine could be developed. The probability that there will be modifications does not
so negate cost and price estimates so as to make them meaningless because the information concerning the anticipated costs and returns need not be exact. The applicable legal standard does not require an applicant to prove with absolute certainty that a paying mine will result. The applicant need only prove that a prudent person would expend additional labor and means with a reasonable prospect of success in developing a paying mine.

APPEARANCES: Lowell L. Madsen, Esq., Office of the Regional Solicitor, U.S. Department of the Interior, Denver, Colorado, for the Bureau of Land Management; Morris B. Hoffman, Esq., Denver, Colorado, for Yankee Gulch Joint Venture, et al.

OPINION BY ADMINISTRATIVE JUDGE MULLEN

The Bureau of Land Management (BLM) has appealed from a November 12, 1987, decision of Administrative Law Judge Harvey C. Sweitzer finding Yankee Gulch Joint Venture and others (collectively referred to as applcants) entitled to sodium preference right leases based on applications C-0118328, C-0118329, and C-0120057. 1/ Judge Sweitzer's decision was rendered after a hearing ordered in Yankee Gulch Joint Venture et al., 84 IBLA 353 (1985) (Yankee Gulch).

1/ Yankee Gulch Joint Venture, the current applicant in lease applications C-0118328 and C-0118329, is comprised of John Dunn, Multi-Mineral Corporation, and Natrona Resources, Inc. (formerly Nielsen Resources Corporation). The current applicants in lease application C-0120057 are Natrona Resources, Inc., Hogle Investment Company, Edward N. Juhan, Barbara Jean Juhan Hunter, and Joseph Paul Juhan. All applicants, except Multi-Mineral Corporation, are represented by Hoffman. Although notified of the proceedings, Multi-Mineral Corporation did not participate during the hearing or this appeal.

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BACKGROUND

Effective April 1, 1964, BLM issued sodium prospecting permits Nos. C-0118328 and C-0118329, to facilitate exploration for sodium deposits in the Piceance Creek Basin in Colorado. Prospecting permit C-0120057 was issued for the same purpose effective May 1, 1964. The permittees did exploratory drilling pursuant to the permits between 1964 and 1966, and exposed large quantities of sodium mineralization. On April 28 and 29, 1966, the permittees filed sodium preference right lease applications for a total of 7,151.19 acres pursuant to section 24 of the Mineral Leasing Act, as amended, 30 U.S.C. § 262 (1982). 2/ This statute gives prospecting permit holders a preference right to lease upon a showing to the satisfaction of the Secretary of the Interior that the land sought contains a valuable mineral deposit and is chiefly valuable for that mineral.

When they filed the lease applications, applicants asserted that valuable deposits of sodium had been discovered. 3/ In a memorandum dated July 27, 1967, the Regional Mining Supervisor, Geological Survey (Survey), stated that, based on the results of drill holes within the lands in lease applications C-0118328 and C-0118329 and other information, the land sought by applicants was deemed to contain valuable deposits of sodium-bearing minerals, primarily in the form of the mineral nahcolite. He further held that the only deposit found chiefly valuable for sodium, when compared to other values contained in the oil shale, was the deposit subject to application No. C-0118328. He recommended that a lease be issued for applica-tion C-0118328 but not C-0118329.

Additional information was subsequently tendered by applicants, and the Regional Mining Supervisor, Survey, prepared another memorandum, dated January 7, 1970. In this memorandum he concluded that the land described in all three lease applications contained valuable deposits of sodium and was chiefly valuable for sodium. He recommended that any lease issued be limited to the saline zone in the Parachute Creek Member of the Green River Formation.

Effective July 1, 1971, four sodium preference right leases, C-0118236, C-0118327, C-0119985, and C-0119986, were issued to the Wolf Ridge Joint Venture (Wolf Ridge) and others, for lands adjoining or near to the lands subject to the three applications now before us. The leases were limited to sodium deposits in the saline zone of the Parachute Creek Member of the Green River Formation and contained additional restrictions designed to protect shale oil values in oil shale within and outside the saline zone.

2/ Specifically, the lands are situated in Ts. 1 and 2 S., Rs. 97 and 98 W., 6th P.M., Rio Blanco County, Colorado.

3/ By decision dated May 3, 1968, the Department afforded applicants an opportunity for a hearing to determine whether the land qualified for leasing pursuant to the statute. See Kaiser Aluminum and Chemical Corp., A-30982 (May 3, 1968). Applicants made timely requests for hearings but no hearings were held.

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By letter dated August 28, 1972, BLM requested additional information, including the proposed mining operations, to permit BLM to complete an environmental analysis of the impact of lease issuance. Additional information was subsequently filed for lease applications C-0118328 and C-0118329. By letters dated June 23, 1976, BLM requested further additional information, pursuant to newly amended regulations applicable to preference right lease applications, specifically 43 CFR 3521.1-1(b). This regulation provides that certain information, including the quantity and quality of the minerals discovered and proposed mining operations, which constitute an initial showing, should be submitted with lease applications. On June 27, and July 5, 1977, applicants submitted numerous additional documents in support of the applications.

By memorandum dated August 13, 1979, the Acting Conservation Manager, Central Region, Survey, recommended to BLM that the initial showing for the three lease applications be accepted. In a memorandum dated January 19, 1982, the Conservation Manager, Central Region, Survey, informed BLM that, pending a final showing and environmental assessment, the land was deemed to contain a valuable sodium deposit and was chiefly valuable for sodium.

By memorandum dated February 10, 1982, the State Director, Colorado State Office, BLM, instructed the District Manager, Craig District, BLM, to prepare a technical examination/environmental assessment in accordance with 43 CFR 3521.1-4. On August 31, 1982, the District Manager transmitted the Final Environmental Assessment (No. CO-017-82-55) to the State Office, with the recommendation that BLM amend the area management framework plan to allow leasing subject to certain stipulations, and contingent upon the applicants satisfying the final showing and chiefly valuable criteria.

By decisions dated February 17, 1983, BLM instructed applicants to submit final showings in accordance with 43 CFR 3521.1-1(c). Proposed leases, substantially identical to those issued to Wolf Ridge and others, were enclosed with the decisions. 43 CFR 3521.1-1(c) provides that, following receipt of the technical environmental analysis report and the proposed lease, an applicant must submit additional information, including estimates of revenues and costs for the proposed mining operations and a comparison thereof. This set of documents was submitted by applicants on April 18, 1983.

By memorandum dated May 6, 1983, the State Director, Colorado State Office, BLM, again requested a District Mining Supervisor, Minerals Management Service (MMS), report and recommendation whether the land involved herein contained valuable deposits of sodium and was chiefly valuable for sodium. However, before the report could be issued, the MMS functions relating to making these reports were transferred to BLM.

In a technical review dated July 22, 1983, BLM concluded that the land subject to applicants' applications did not contain valuable deposits of sodium because there was not a reasonable probability that the sodium could be mined, extracted, removed, and marketed at a profit. BLM based this conclusion in part on its determination that, under the proposed lease, the structural integrity of the oil shale deposit must be preserved, and

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applicants had not demonstrated that this could be done at a cost which would permit competitive marketing. On December 2, 1983, applicants submitted a response to BLM's technical review and additional evidence in support of their lease applications.

In a March 13, 1984, decision, BLM rejected applicants' applications, stating its determination that the land did not contain valuable deposits of sodium. The rejection determination did not address whether the land was chiefly valuable for sodium. BLM stated:

> For the reasons more fully elaborated in our report of July 22, 1983, it is our conclusion that you have failed to provide information to give us reasonable assurances that your develop-ment plans will allow economic extraction of the sodium deposits without damage to the oil shale resources in accordance with the provisions of the proposed lease. It is not enough to claim that no damage will occur. It is the obligation of the applicant to submit reasonable factual evidence that this can be done. In the absence of such evidence the BLM has no choice but to deny lease issuance. It is not the purpose to issue preference right leases for research projects designed to test the feasibility of unusual mining or processing scenarios or to determine whether mined products can be processed to meet requirements of speculative markets.

See Yankee Gulch, supra at 354-56. 4/ Yankee Gulch appealed BLM's decision to the Board.

In our January 1985 Yankee Gulch decision, we found applicants had alleged sufficient facts which, if proven, would demonstrate entitlement to sodium preference right leases. We set aside BLM's decision and ordered a hearing to determine whether a valuable sodium deposit had been discovered within the limits of each permit area and whether the land is chiefly valuable for sodium. Applicants were charged with going forward and the ultimate burden of proof on both of these issues. Id. at 358.

Certain parameters for resolving these issues were set out in our decision. We stated that the valuable deposit must be shown to exist as of the expiration date of the prospecting permits, i.e., March 31, 1966, for permits C-0118328 and C-0118329 and April 30, 1966, for permit C-0120057. We further noted that the case involved

> crucial questions whether the sodium in the saline zone of the Parachute Creek Member of the Green River Formation found in the lands subject hereto can be economically extracted without adversely affecting the surrounding oil shale resources, i.e., considering the expense of protecting such resources can the sodium * * * be mined, extracted, removed, and marketed at a profit. These questions involve a consideration of mining technology.

4/ A more detailed history of these applications can also be found at pages 2-10 of Judge Sweitzer's decision.

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Id. at 357 (footnote omitted). We also noted an apparent question regarding whether there was a demand for nahcolite as an agent in removing sulfur dioxide from the gaseous emissions of industrial plants, one of the purported markets for nahcolite. Id.

We limited the evidence regarding these issues to that evidence which either demonstrated facts known prior to the expiration of the prospecting permits or was reasonably anticipated at that time, noting that evidence of a reasonable expectation that the mineral could be mined, extracted, removed, and marketed at a profit could be considered in determining the existence of a valuable deposit. We elaborated:

> Thus, for instance, if an applicant could reasonably expect that mining technology would be developed within a reasonable period of time so as to make extraction of the mineral profitable, evidence of such reasonably anticipated technological improvement could be introduced to demonstrate that a valuable deposit did exist as of the dates of expiration of the permits. On the other hand, speculation regarding what improvements in mining technology might be developed in the future is not relevant to this determination.

Id. at 357-58. We also directed consideration of whether issuance of the Wolf Ridge leases would also indicate the existence of valuable sodium deposits in the lands at issue, and whether the prior Survey determinations are relevant to the current determination. Id. at 358 n.4.

A 6-day hearing was held before Administrative Law Judge Harvey C. Sweitzer on July 28-31, August 1 and August 4, 1986. Applicants called seven witnesses and introduced 46 separate exhibits, as well as the entire administrative record (Exh. 239). 5/ BLM produced four witnesses and submitted 16 additional exhibits. Extensive post-hearing submissions were filed by both parties.

JUDGE SWEITZER'S DECISION

In his November 12, 1987, decision (attached as Appendix "A") Judge Sweitzer found applicants entitled to sodium preference right leases. We will briefly outline his decision to facilitate an understanding of this decision.

After reciting the historic background, Judge Sweitzer defined the issues and the burden of proof. He then discussed applicable statutes and regulations and outlined the history of the standards set forth in the relevant regulations. He stated:

> Thus, the test for determining whether a sodium prospecting permittee has discovered a valuable deposit * * * is (and has been) the same as the test for determining whether a mining

5/ Applicants' exhibits were given numeric designation. BLM's exhibits were identified by letters.

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> claimant has perfected his claim by the discovery of a valuable mineral. * * * Satisfaction of the test requires the exposure of valuable mineralization of such quantity and quality that a person of ordinary prudence would be justified in the further expenditure of efforts and means in the reasonable expectation of developing a profitable mine. * * * This so-called "prudent man test" has been further refined by the so-called "marketability test," which requires that the value of the mineral deposits exceed the costs of extracting, processing, transporting and marketing those deposits. * * * The test, however, does not require proof positive that the mineral deposit is profitable at the present (or any particular) point in time; it requires only a reasonable expectation that a profitable mine can be developed. [Emphasis in the original.]

(Decision at 15-16) (citations and footnote omitted). He further stated that the test for determining whether the lands are chiefly valuable for sodium is a comparison between mineral and non-mineral values. Id. at 16.

Judge Sweitzer found agreement on several points. These included: 1) the core holes drilled under the prospecting permits exposed sodium on land subject to each application; 2) the extent of the deposit is enormous; 3) the quality of the minerals is good; and 4) markets currently exist and may be developed for the sodium products which can technically be produced. He framed the key question as being whether applicants could develop a profitable mine, given the complexity added by the imposition of the requirement to preserve the oil shale deposits. Id. at 16-17.

Addressing the specific issues raised by the Board, Judge Sweitzer first reviewed the prior Survey conclusions that valuable deposits of sodium had been discovered. He concluded that, although these determinations evidence the existence of a deposit, they did not fully consider the costs of mining and producing marketable sodium products, and therefore did not prove that the deposit is valuable. Id. at 19. After reviewing the evidence regarding issuance of the Wolf Ridge leases and subsequent development on those leases, he found that the issuance and subsequent development provided limited support for finding that a valuable sodium deposit has been discovered on applicants' lands. Id. at 20-21.

Judge Sweitzer next reviewed the evidence of what was known when the prospecting permits expired in 1966, including evidence of the quantity and quality of the deposit, mining technology, marketability, and additional costs of preserving the oil shale. He found that each hole drilled under the prospecting permits exposed sodium of significant quality and quantity. He further found that applicants had contemplated both solution mining and conventional room and pillar mining in 1966, and the two mining methods were technically feasible. Id. at 21-22. He also held that the weight of the evidence indicated that the presence of the oil shale would not have a material adverse economic effect on either room and pillar mining or solution mining. Id. at 23-24.

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Judge Sweitzer also concluded that there was sufficient evidence that applicants reasonably expected that they would be able to profitably market sodium products from the deposit. He indicated that the rough cost/price studies submitted with the lease applications in 1966 demonstrated applicants' expectation in 1966. He specifically noted that an established and growing market for soda ash existed in 1966, and found that subsequent independent studies confirmed applicants' anticipated ability to market the mined product at a profit.

He also concluded that in 1966 it was reasonable to anticipate a new market for nahcolite as a flue gas desulfurization reagent, and that applicants became familiar with this possible market before 1966. He noted that, although there is no demand for nahcolite for that purpose, the evidence supported a finding that industry has an interest in using nahcolite as a reagent, and that pilot tests indicate that the potential use of nahcolite as a "dry scrub" is very practical and economic. He found that no plant currently uses nahcolite as a scrub because nahcolite is not currently available in commercial quantities. Id. at 22-24.

Judge Sweitzer found that the Government had discretionary authority to deny issuance of prospecting permits in 1964, but that the policy question of whether it was in the public interest to issue a sodium lease should have been made before the prospecting permit issued. He stated that, when it issued the prospecting permits, the Department irrevocably committed itself to lease issuance if the permit holder could satisfy the statutory requirements by showing a discovery of a valuable sodium deposit and that the land is chiefly valuable for sodium. He reviewed BLM's March 13, 1984, rejection decision, and concluded that the decision (and the technical review which supported it) erroneously relied on a marketability test based only upon economic values existing at that time, without considering whether there was a reasonable likelihood of success in developing a paying mine. He also asserted that the technical review had applied the excess reserves rule, noting that this rule had been challenged by Baker v. United States, 613 F.2d 224 (9th Cir. 1980). 6/ He further criticized the review's assertion that lease issuance would not be in the public interest, because that consideration had been precluded. Id. at 24-28.

6/ Judge Sweitzer's assertion that "there was no basis for applying the 'too much' (or excess reserves) rule: the rationale that when an existing market is fully supplied new resources have no value," is correct, but he may have done so for the wrong reason. The excess reserve question admits "that the mineral, qua mineral, exists within additional claims, but raises the contention that because of the quantity of minerals in other claims owned by a mining claimant, the mineral in certain other claims would have no market and thus is essentially valueless." United States v. Williamson, 45 IBLA 264, 294, 87 I.D. 34, 50 (1980). Having no evidence that applicants have any source of nahcolite other than the lands subject to the applications, we find no basis for ruling that the rule could be applicable. If the reference in the technical review was based on contemplated market entry problems associated with a saturated market, a different problem

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Judge Sweitzer concluded:

> Thus, it no longer matters whether [BLM] erred in issuing the subject prospecting permits, nor does it matter what the Department's policy toward the development of sodium and oil shale "ought" to be, nor does it matter what the applicants' motives might be in applying for these sodium leases. The only two issues relevant to this proceeding are (1) do the lands contain "valuable deposits" of sodium and, if so, (2) are the lands "chiefly valuable" therefor?
>
> I find that the [applicants] have submitted a wealth of information which, when taken together, indicates that both conventional room and pillar and in situ solution mining techniques are technically and economically feasible methods to conduct a nahcolite-only mine on the subject [preference right lease application (PRLA)] lands, and that the deposit is pres-ently marketable (See, e.g., Exhs. 206, 215, 239: B-5, B-6). The information submitted is sufficient to support a finding that a person of ordinary prudence would be justified in the further expenditure of substantial efforts and means in the reasonable expectation of developing a profitable nahcolite-only mine. [BLM] has not submitted evidence sufficient to overcome [applicants'] showing, nor even to place the issues
> in equipoise.
>
> I therefore find that the [applicants] have shown by a preponderance of the evidence that the subject PRLA's contain valuable deposits of sodium and that the lands are chiefly valuable therefor. The [applicants] are entitled therefore to sodium preference right leases for the subject lands. 30 U.S.C. § 262.

Id. at 28-29. An appeal from this decision was then filed by BLM.

ARGUMENTS ON APPEAL

In its statement of reasons for appeal (SOR), BLM contends that Judge Sweitzer erred when finding applicants entitled to sodium preference right leases. BLM argues that, both as of 1966 and today, applicants have failed to prove a discovery of a valuable sodium deposit in the lands encompassed by their prospecting permits. 7/

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fn. 6 (continued)
exists. See e.g., Melluzo v. Morton, 534 F.2d 860 (1976). In any event, the rationale of the decision in Baker v. United States, supra, was undercut by the Ninth Circuit's decision in McCall v. Andrus, 628 F.2d 1185 (1980). See United States v. Oneida Perlite Corp., 57 IBLA 167, 88 I.D. 772 (1981).

7/ BLM also argues that Judge Sweitzer erred in finding that the issuance of the Wolf Ridge leases provides some evidence that applicants discovered a valuable deposit. BLM states that the record demonstrates that those leases

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BLM alleges that, for 1966, the Judge's findings are inconsistent, conclusory, and not supported by any credible evidence. Specifically, BLM contends that there is no credible evidence supporting the Judge's conclusion that the use of solution mining to recover the sodium deposits was contemplated prior to the expiration of the prospecting permits, or within a reasonable time thereafter. BLM states that the record demonstrates that conventional room and pillar mining was the only mining proposed in applicants' original applications.

According to BLM, there is no evidence that in 1966 (or within a reasonable time thereafter) a prudent person would have considered solution mining a viable method for mining sodium, either generally or specifically for a lease subject to the oil shale restrictions. BLM argues that the testimony by Irvin Nielsen (Nielsen), one of the applicants, that they were interested in solution mining the properties in 1966 (Transcript (Tr.) at 84-86) is not sufficient to prove their contemplated use of that technique, especially in light of applicants' failure to formally propose the use of that method until their final showing in 1983. BLM also contends that the June 12, 1967, report by Heinrichs Geoexploration Company (Heinrichs Report) (Exh. 239, E-21), relied upon by Judge Sweitzer as corroborating evidence that solution mining was known and considered viable in 1966, does not sufficiently establish those facts.

BLM further contends that the 1971 Shell test (using solution mining with hot water to leach nahcolite as a first step in the recovery of oil from oil shale) provides no support for applicants' assertion that solution mining was contemplated, because there is no evidence that the test was based on technology in existence or reasonably anticipated in 1966, and because the lease terms prohibit the use of heat in mining sodium.

BLM also argues that there is no evidence that a mining operation to recover only the sodium was technically or economically feasible in 1966. BLM notes that applicants assumed that they would have access to all minerals in the saline zone when the applications were originally prepared. According to BLM, the Survey made its evaluations using the same assumption, and therefore the Survey recommendations provide no basis for concluding

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fn. 7 (continued)
were issued erroneously, and contends that they were issued based on the assumption that the lessees could mine oil shale as well as sodium, even though mining of oil shale was specifically precluded by the lease terms. Additionally, BLM alleges that the wrong standard was used in determining whether the deposits in the Wolf Ridge leases were valuable, because the basis for that determination focused solely on whether sodium was present in commercial quantity and quality, with no consideration being given to production costs, marketing costs, and the existence of markets. Based on the decision and the record, we find that Judge Sweitzer placed little reliance, if any, on the issuance of the Wolf Ridge leases in his determination. There is more than sufficient other evidence to support his conclusion that applicants had discovered a valuable deposit of sodium. Therefore, we do not find it necessary to rule specifically on this issue.

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that a room and pillar mine operating under the restrictive lease terms would be technically or economically feasible. According to BLM, there is no other evidence to support a finding of feasibility or profitability in 1966.

BLM further contends that in 1973 applicants admitted that they lacked sufficient knowledge of the saline zone to prepare a simple narrative statement of proposed mining, processing, and marketing plans. BLM concludes that in 1966 no prudent person would have expended time and money to develop a conventional room and pillar sodium-only mine under the restrictive lease terms, because there was not enough data to justify such expenditures, and therefore further exploration work was necessary.

BLM also challenges Judge Sweitzer's conclusion that in 1966 there was a reasonable expectation that the sodium products could be profitably marketed, alleging that Exhibit 86, cited in his decision as supporting this conclusion, deals with multi-mineral development, rather than just the sodium. BLM further argues that there is no credible evidence supporting Judge Sweitzer's conclusion that in 1966 there was a reasonable expectation that a flue gas desulfurization reagent market would be developed. BLM states that this is especially true in light of his additional finding that there currently is no demand for nahcolite for that purpose. BLM contends that the Farris and Mains 1978 Dawsonite and Nahcolite Survey (Survey) (Exh. 239, E-26), cited by Judge Sweitzer as substantiating the reasonableness of applicants' marketability expectations, is based on unsupported cost assumptions and couched in disclaimers. It is further noted by BLM that the Survey acknowledges many feasibility problems, both technical and economic, connected with mining the saline zone and recommends research to resolve these problems.

BLM concludes that applicants failed to reconstruct market conditions as of 1966, including unit prices, transportation and production costs, etc., with factual evidence of conditions actually prevailing at that time. It argues that it is impossible to extrapolate any credible evidence regarding a sodium-only mine from the conclusory, rough studies prepared in connection with proposals for mines which would extract all minerals.

BLM devotes the balance of its SOR to its contention that applicants have also failed to show that the deposits are currently valuable. According to BLM the evidence demonstrates that sodium cannot be economically extracted by solution mining without adversely affecting the surrounding oil shale, and that applicants cannot profitably recover the sodium by conventional room and pillar or solution mining.

BLM first argues that applicants have failed to demonstrate by a preponderance of the evidence that a reasonably prudent person could now expect that the sodium deposits can be mined, processed, and marketed at a profit using conventional room and pillar mining methods. It contends that applicants rely solely on a document entitled "Commercial Facility Conceptual Design Phase I," prepared in 1982 by Multi-Mineral Corporation (MMC) (Exh. 239, B-3 Exh. 5), to support this conclusion. BLM states that the MMC document presents a site specific mining plan for the Boies bed (a rich,

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oil-shale-free nahcolite bed not found on the lands in question), and applicants have not shown that the estimated cost of developing the Boies bed would apply to the thinner beds found in the lands described in the applications. It also contends that the record shows that MMC subsequently revised its plan, reevaluated its opinion, and concluded that sodium-only development cannot be carried out economically when so much of the sodium resource is excluded from development by the lease stipulations designed to protect the oil shale.

BLM attacks the feasibility of applicants' solution mining plan on several fronts. It argues that the lease terms preclude the application of the process. BLM contends that the proposed lease terms prohibit the mining of oil shale by the use of heat and prohibit the use of any process that results in destructive distillation of 25 G.P.T. oil shale, retorting of the oil shale, or other significant changes in the composition of the oil shale. BLM asserts that applicants' expert witness, Alfred T. Ireson (Ireson), testified that oil shale begins to retort at temperatures as low as 300 degrees Fahrenheit (Tr. at 235). BLM concludes that applicants' proposed solution mining will result in destructive distillation, retorting, significant changes in the composition of the oil shale, and violate the proposed lease terms, and its use is therefore prohibited.

In addition, BLM notes that none of the experts were sure of the effect that solution mining of the nahcolite would have on subsequent oil shale recovery and argues that the proposed leases require applicants to show that the sodium can be developed without rendering the oil shale unfit or significantly lowering its quality for future retorting purposes. BLM contends that the evidence shows that solution mining will have an adverse effect on the oil shale in and above the saline zone rendering it less suitable for development, retorting, processing, use, and disposition. BLM asserts that the remaining oil shale would be less suitable for recovery because it would not be uniform in size, which is important to the recovery of oil shale by the modified in situ method. BLM also argues that fracturing could create communication between the dry saline zone and the wet leached zone located above it, and that subsidence of the overlying strata would cause ground water problems and weaken the rock, making it more difficult to mine.

BLM next argues that, assuming the Shell process could be employed to mine the saline zone in a manner consistent with the lease terms, there is no credible evidence that the process will work. Applicants' assumptions regarding both the technical and economical feasibility of solution mining the sodium in the saline zone are, in large part, based on the Shell process, and BLM presents what it perceives to be shortcomings of that test at length and in considerable detail.

BLM contends that unrebutted evidence in the record establishes that the Shell test failed in its ultimate goal -- production of shale oil. BLM bases much of its discussion of the Shell test on the testimony of its expert, Roger Day (Day) who reviewed the literature concerning the Shell test and papers addressing various solution mining processes, and opined that a regular shaped cavity with a 175-foot diameter cannot be created by solution mining and that there are technical problems with regulating cavity

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growth (Tr. at 600-09, 640-41). BLM argues that, although Ireson testified that there were no problems with the nahcolite leaching phase of the test (as opposed to the recovery phase which was designed to recover the shale oil left in the cavity), there actually were problems, including the inability to leach with cold water and the slow production rate.

BLM believes that the results of the Shell test do not support the assumptions upon which applicants base their analysis of the technical and economic feasibility of its solution mining plan. It notes that applicants base their submissions on their anticipated ability to create a 500-foot-high cavity that would grow at a rate of 0.3 ft/day to a maximum diameter of 175 feet and produce approximately 200,000 tons of nahcolite a year. (See Exh. 186A at 73 and Exh. 186B at 71.) BLM argues that the Shell test did not come close to producing a cavity of the size envisioned by applicants and that its production rates fell far short of the rate assumed by applicants. Thus, according to BLM, the Shell test provides no support for the feasibility evaluations in applicants' final showings, because the analysis in those showings is based on production figures not supported by the
Shell test. BLM further contends that the V. Rajaram study (Exh. 239, B-3 Exh. 5), is also based on the erroneous assumptions that a 175-foot diameter cavity can be created and controlled, and that the injected solutions can have temperatures above 300 degrees. 8/

BLM asserts that Judge Sweitzer's finding that applicants had submitted information demonstrating that both conventional mining and solution mining are technically and economically feasible is not supported by the exhibits he cited. BLM states that marketing survey responses contained in Exhibit 206 indicate only that there would be a market for nahcolite if the price was competitive and contends that there is no evidence that nahcolite could be mined and delivered at a competitive price. BLM argues that Exhibit 215, which includes applicants' response to BLM's technical review of their final showings, fails to demonstrate that applicants are relying on anything other than the flawed analysis found in their final showings.

BLM alleges that the response does not show that MMC erred when concluding that a conventional mine for sodium recovery only would not be commercially successful or show a reasonable expectation that disseminated nahcolite can be solution mined, processed, and marketed at a profit. According to BLM, the optimistic market predictions by Gale Peters (Peters) in a letter included in the response falls flat in light of the fact that Wolf Ridge has been unable to develop commercial operations on its leases for more than 17 years. Additionally, BLM believes that the Stone and Webster Engineering Corporation (SWEC) letter responding to the technical review (stating that BLM improperly used phrases in its 1983 Prefeasibility Study (Exh. 239, B-3 Exh. 8) out of context) does not change the fact that

8/ BLM parenthetically notes that the study found that cavities with a diameter of 175 feet would not provide for the future retorting of the oil shale, contrary to applicants' claim that solution mining will not render the oil shale less suitable for future development.

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the study contains crucial sections based on the same unsupported assumptions as the final showings. BLM further contends that the revised and updated cost estimates and economics in the response to the technical review report provide none of the information a reasonable person would demand before deciding whether there is a reasonable prospect of success in developing a valuable nahcolite solution mine and processing plant. It also contends that a similar plan for the Rock School lease (one of the Wolf Ridge leases) failed to generate any investors. In short, BLM contends that after considering the information supporting the final showings and proposed lease terms, a reasonable person could not expect that a sodium-only operation on the property would have a reasonable prospect of becoming a paying mine.

BLM argues that there is no credible evidence that there is a reasonable prospect that a mine program in compliance with the restrictions in the proposed lease would be profitable, asserting that applicants' statement that, if leases are issued, conservation will be considered and insured by the lease terms does not satisfy applicants' burden on this point. BLM challenges the Judge's conclusion that no evidence has been presented to indicate how, if at all, the coexistence of the oil shale would adversely affect the economics of either room and pillar or solution mining, repeat-ing MMC's revised conclusion that a sodium-only conventional mine is not economically feasible. BLM notes that the room and pillar process described by Judge Sweitzer involves removal of the material to the surface, crushing, separating the sodium minerals, and returning the oil shale to the mine as backfill to prevent subsidence. BLM considers this process unusable because, according to BLM, the lease terms prohibit significant extraction of 25 G.P.T. oil shale, precluding room and pillar mining where the oil shale contains 25 G.P.T. or more of shale oil. BLM asserts that the lease also requires that mined oil shale averaging less than 25 G.P.T. must be saved for further processing by the United States, thus barring use of such oil shale as backfill. BLM argues that, because solution mining requires the use of water above 300 degrees F. and oil shale begins to retort at these temperatures, the terms prohibiting the retorting of the oil shale preclude the hot water solution mining method proposed by applicants. Therefore, BLM argues that, contrary to the Judge's findings, there is abundant unrebutted evidence that the coexistence of the oil shale would have an adverse economic affect on hot water solution mining because, according to BLM, this method cannot be used, and therefore has no economic feasibility.

BLM next addresses the marketing study information presented in the Nahcolite Solution Mining Plan prepared by Natrona Resources, Inc. (part of Exhibit 215) and discussed in testimony given by George Kane (Kane). BLM asserts that this study was based on the assumption that applicants can sell nahcolite for $175 per ton. In turn, this selling price was derived from the costs of solution mining, using the Shell test as a basis for those costs, even though this process cannot be used. BLM notes that applicants have submitted no evidence to show the effect of using some other method of solution mining on the assumption that nahcolite could be profitably sold at $175 per ton, and contends that a less efficient method would increase the mining costs. BLM asserts that applicants' marketing survey reveals that

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potential buyers would be willing to buy only when the cost is competitive, and having failed to specify an acceptable method of solution mining, applicants cannot prevail on their unsupported argument that an operation other than the one proposed in the final showings will be successful.

BLM also challenges applicants' assertions that there are markets for nahcolite and the products produced from it, and that they can penetrate those existing markets. BLM notes that after 17 years the Wolf Ridge leases are not producing sodium, and contends that this failure stems from the fact that, under the lease terms, it is not technically or economically feasible to mine sodium. BLM further argues that applicants' evidence regarding the market for the product is flawed. BLM contends that Kane's testimony is based on work done by Peters (who did not testify due to conflicts 9/) and thus constitutes hearsay and is entitled to little weight. Additionally, BLM asserts that Kane's testimony also showed a lack of care in his review and analysis of Peters' work and demonstrated his lack of familiarity with important facts and concepts, thus rendering the testimony unreliable. BLM then refers to Day's testimony that the existence of eight producing plants with excess capacity would have an adverse impact on the likelihood of new producers penetrating current markets. BLM states that, contrary to Judge Sweitzer's finding, it did not concede that markets exist for the sodium deposits found in the land applied for, much less that the sodium is marketable at a profit, but does admit that industry uses products which can be manufactured from the mineral contained in those deposits.

Finally, BLM argues that subsequent development work on the Wolf Ridge leases does not support a discovery finding. BLM asserts that, because there is no evidence that the experimental "horizontal" solution mining on the adjacent Wolf Ridge leases is in any way similar to applicants' solution mining program, the Wolf Ridge work does not indicate that oil shale conservation would be possible under applicants' "vertical" solution mining plan. BLM notes that Wolf Ridge is proposing solution mining the Boies bed not found on the lands subject to the applicants' applications, and is not attempting to recover the nahcolite disseminated in oil shale. BLM also contends that there is no evidence that the Wolf Ridge leases are being mined commercially or that Wolf Ridge has worked continually to develop its leases since issuance. The most applicants have shown, according to BLM, is that limited experimental work has been conducted and Wolf Ridge proposes a limited mining operation to test the feasibility of solution mining a bed of nahcolite not found on applicants' lands. BLM further states that there is

9/ BLM renews its motion to strike the assertion in applicants' post-hearing reply brief that Peters did not appear because of a conflict of interest, not a scheduling conflict. The Judge denied that motion, finding that neither applicants' uncorroborated explanation nor BLM's speculation that the absence was due to a scheduling conflict would be afforded weight to the prejudice of the other. The Judge further held that, "[a]lthough the disputed language is of questionable probative value, it nevertheless has some limited relevance which justifies its existence in the administrative record of this case." Order dated Feb. 27, 1987. We agree and deny BLM's renewed motion to strike.

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no evidence that Wolf Ridge has the funds to follow through with its proposal, which creates a presumption that the sodium deposits are not marketable at a profit, and therefore applicants have failed to prove that they have discovered a valuable sodium deposit.

In summary, BLM concludes that applicants have failed to prove by credible evidence that valuable deposits of sodium had been discovered prior to the 1966 expiration of their prospecting permits or exist at the present time. 10/ It urges this Board to find that there is no credible evidence that a reasonably prudent person is or would have been justified in concluding that a valuable deposit exists or existed within the boundaries of the lands described by the lease applications, and that no preference right leases should be issued.

In their Answer, applicants agree with Judge Sweitzer's findings and urge a decision sustaining him. They state that he correctly found that the requisite technology for extracting sodium from the lands embraced in the lease applications either existed or could reasonably have been foreseen in 1966. Applicants explain that, although they focused on solution mining by vertical cavity in their final showings because it is more economical than conventional mining, the record clearly shows that sodium can also be profitably mined using conventional room and pillar mining methods. They contend that no factual controversy exists regarding the technical feasibility of conventional room and pillar mining, noting that BLM officials suggested that they include that method as an alternative in their proposals because it was a proven technique.

Applicants contend that, contrary to BLM's assertions, their proposed solution mining technique is technically feasible and was technically feasible in 1966. They contend that the Judge properly found that the weight of the evidence clearly demonstrates that the process is and was feasible, as was proven by the 1971 Shell test. Applicants state that Nielsen and the two leading experts in the field of solution mining, Thomas Beard (Beard) and Ireson, testified to its feasibility.

Applicants state that solution mining has been used for 1,000 years, and that salt has been mined in this country using a form of this process for at least 100 years. They note that Nielson testified that general solution mining technology was well-known in 1966, that FMC Corporation had performed considerable work in the 1950's on the solution mining of trona, and that in 1966 he intended to apply solution mining technology to remove nahcolite (Tr. at 83-86). They note that the existence of solution mining as a feasible nahcolite mining technology in 1966 is further corroborated by the Heinrichs report (Exh. 239, E-26).

Applicants assert that the 1971 Shell test conclusively demonstrated the feasibility of solution mining nahcolite. They note that the vertical

10/ BLM does not directly address the chiefly valuable issue, but notes that if the sodium deposits are not valuable, it follows that the lands cannot be chiefly valuable for sodium.

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solution mining process tested by Shell and patented by Beard was part of a larger process designed ultimately to retort oil shale in situ. The process involved the injection of water into the nahcolite-bearing interval to dissolve nahcolite, leaving a cavity of honeycombed oil shale which would then be rubblized and retorted by raising the temperature in the cavity. Ireson, the project engineer for the test, testified that the nahcolite leach phase of the test was completed without any problems (Tr. at 248). 11/

Applicants state that the only evidence challenging the feasibility of vertical solution mining is found in Day's testimony. They first attack his credentials, arguing that his lack of expertise renders his opinions of little value. They note that Day has never participated in any actual field testing of the process, and bases his conclusion solely on his review of literature on solution mining prepared by others and laboratory work. Applicants further assert that none of the literature he relies upon deals with the vertical solution mining of nahcolite, and contend that the Day's testimony is not that vertical solution mining is technically infeasible, but simply that he disagrees with Nielsen, Beard, and Ireson's conclusion that the Shell test proved the feasibility of the solution mining process (Tr. at 707). Applicants note that Day is employed by a company holding an interest in the Wolf Ridge leases, and suggest that he should not be considered a disinterested witness. In short, applicants contend that they have met their evidentiary burden by proving the feasibility of their proposed solution mining process by the preponderance of the evidence, as well as by demonstrating the unquestioned feasibility of conventional mining of the sodium deposits.

Applicants next argue that the Judge correctly found that there was a market for the product in 1966, and that additional markets were reasonably foreseeable at that time. They agree that, given these markets and the proposed mining methods, a reasonably prudent person would have expended funds in 1966 with the reasonable expectation of developing a profitable mine. They find support for this conclusion in Kane's testimony.

Kane stated that nahcolite can be processed into five potential products: 1) sodium bicarbonate (both U.S.P. grade and non-U.S.P. grade); 2) refined soda ash; 3) unrefined soda ash; 4) caustic soda (lye); and 5) Shale glass (Tr. at 413-19; Exh. 234). He recognized that nahcolite had never been commercially processed to make these products, but asserted that the reason is that nahcolite has not been commercially available. He noted,

11/ Although sufficient quantities of nahcolite were not being dissolved by the injection of cold water, when the temperature of the injected water was raised, significant amounts of nahcolite began to be leached (Tr. at 240, 242-45). Problems occurring during the higher temperature recovery phase, which was designed to recover the shale oil from the remaining oil shale, resulted in the ultimate failure of the Shell test. Applicants argue, however, that there were no technical problems with the nahcolite leaching phase, and repeat that both Nielsen and Ireson testified that they believed that vertical solution mining as proposed by applicants is feasible, and was proven feasible by the Shell test.

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however that (except for shale glass) the processes are well known and have been used for years in the soda ash and sodium bicarbonate industries (Tr. at 509-10). He further noted that, because nahcolite is natural sodium bicarbonate, applicants could produce sodium bicarbonate more cheaply than it is produced by the current synthetic process (Tr. at 461-62). Applicants contend that Kane's conclusions are corroborated by Peters' letter (Exh. 215). Kane stated that markets for sodium bicarbonate, the principle product from nahcolite, existed in 1966, as well as today, and stated his opinion that sodium bicarbonate could and can be produced by vertical solution mining at a cost which would permit applicants to penetrate existing markets.

Applicants acknowledge that Kane is not an economist, but argue that he gained extensive experience in marketing through his work on the marketing aspects of the Rock School lease project and his association with Peters who is a world-renowned expert in the sodium industry. 12/ Kane stated that current demand for sodium bicarbonate exceeds 335,000 tons per year and that this demand is met by companies producing U.S.P. grade sodium bicarbonate from trona (Tr. at 420-32). He opined that applicants would be able to penetrate the market because there is currently an unmet demand for non-U.S.P. grade sodium bicarbonate, which can be easily produced from nahcolite. He also testified that even if there were no increased demand, consumers are extremely price-sensitive, and applicants could sell at $175 per ton and thus capture at least a part of the market. He asserted that applicants would provide a second source of sodium bicarbonate not dependent on trona (Tr. at 432-43). Applicants contend that Kane's conclusion that there are existing and penetrable markets for applicants' sodium products is sup-ported by Peters' letter (Exh. 215) and MMC's marketing study (Exh. 239, B-3 Exh.5). Applicants also note that Nielsen and Beard testified that they believed there were markets for the sodium in 1966 and at the time of the hearing (Tr. at 102, 195).

Applicants argue that there is also a large potential market for nahcolite as a flue gas desulfurization reagent. They assert that as early as 1965 Nielsen and others discussed the possibility of using nahcolite to remove sulfur dioxide from coal-fired power plants (Tr. at 103-04). They point to testimony regarding the 1970's studies of soda ash, trona, and conventionally mined nahcolite as dry scrubbing reagents, conducted by the Electric Power Research Institute (EPRI), as demonstrating that conventionally mined nahcolite was the most effective reagent in terms of removal efficiency and that its use was economically comparable to trona (Tr. at 444-53; Exh. 238). According to applicants, the use of solution-mined nahcolite for treatment of emissions from firing coal typically found in the West would be significantly more economic than using trona (Tr. at 451; Exh. 238). Conceding that this is a future market, applicants allege that it was reasonably foreseeable in 1966 and would therefore support a prudent person's decision to proceed to develop the sodium resource. Applicants

12/ Applicants justify their failure to call Peters as a witness by stating that he was unable to testify due to conflicts. See n. 9, supra.

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contend that when Kane's testimony is considered with the extensive documentary evidence consisting of marketing reports and studies, the record establishes the reasonableness, in 1966 and today, of expending additional time and effort in developing the sodium resources.

Applicants contend that they have submitted extensive evidence demonstrating that the costs of extracting the nahcolite by either conventional or solution mining will give them a significant cost advantage over the synthetic manufacturers of sodium bicarbonate. They point to Kane's testimony, MMC's study, the SWEC study, and the analogous situation where Wyoming trona producers captured the soda ash industry from the producers of synthetic soda ash as supporting this conclusion. They dispute BLM's assertion that their reliance on the MMC study is flawed because MMC envisioned mining the Boies bed which does not exist on their lands. They contend that geologic conditions make it reasonable to anticipate that the Boies bed exists within the lands subject to the applications, but if it didn't those lands are known to contain other targetable beds of nahcolite (which will be fully identified when applicants are permitted to undertake development work similar to that performed on the Wolf Ridge leases).

Applicants also contend that MMC did not recant its prior determination, noting that the letter BLM relies upon was written in response to the draft supplemental environmental impact statement (EIS) for BLM's prototype oil shale leasing program, and was not written to analyze the feasibility of a sodium-only mine. Applicants further allege that the gist of the entire quotation is that MMC believed that a sodium-only mine could not compete with the contemplated multi-mineral development operations, and was not a broad conclusion that a sodium-only mine would not be economically feasible. Applicants argue that the MMC conclusion should not be construed to support a conclusion that applicants have not discovered a valuable sodium deposit without considering the deposit as a part of a multi-mineral mine. Applicants submit that Judge Sweitzer correctly concluded that the weight of the evidence regarding projected extraction costs and revenues demonstrates that a reasonable person would expend further efforts with a reasonable anticipation of developing a profitable mine.

Applicants argue that the Judge also correctly found that the oil shale resource can be adequately protected without materially affecting the costs of extracting the sodium. They acknowledge that, under the lease terms, they cannot mine 25 G.P.T. oil shale, but state that if conventional mining methods are used, they will be able to selectively mine to avoid areas with 25 G.P.T. oil shale. Applicants contend that BLM has submitted absolutely no evidence demonstrating that the adherence to the lease terms would significantly increase conventional extraction costs.

Addressing the same issue, applicants explain that, under their solution mining proposal, virtually all of the oil shale will remain in the cavity and therefore not be mined. They assert that, in fact, the leaching of the nahcolite could actually enhance the recovery of the oil shale. (See Tr. at 229-38, 668.) Applicants contend that, contrary to BLM's assertion, the lease terms prohibiting destructive distillation of the oil shale do not prohibit solution mining, noting that Wolf Ridge is conducting solution

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mining on its leases. They argue that there is no evidence that properly controlled solution mining would cause destructive distillation of the oil shale even though small amounts of kerogen might be converted to shale oil at the higher of the temperatures they propose to use. They point out that the leases do not define the term "destructive distillation," and state that those leases must be interpreted in accordance with well-recognized mining law principles to allow a sodium lessee to do whatever is necessary to extract the sodium so long as the oil shale is not substantially damaged. Applicants contend that the record contains no evidence that a small amount of conversion which might be caused by their solution mining would damage the oil shale in any way, and note that BLM's witness, Day, admitted that leaching the sodium could enhance future recovery of shale oil (Tr. at 668). Applicants further allege that use of heat when solution mining sodium does not violate the proposed lease terms because those terms do not prohibit the use of heat to separate the sodium from shale if shale oil is not mined, extracted, or processed by the use of heat. Applicants conclude that the reasonable person inquiry must be based on the broader showings of resources, proposed extraction methods, anticipated costs, and expected revenues, and not on the speculative meaning BLM might attach to terms in leases which might be negotiated.

Applicants admit that solution mining may raise the significant mitigation issue of subsidence. They note that Glenn Miller (Miller), who testified for BLM, stating his belief that the size and spacing of the cavities proposed by applicants could result in subsidence and related hydrological problems (Tr. at 789-97, Exhs. MM and NN), also testified that a scaled-down operation either creating smaller cavities or increasing the spacing between cavities would reduce the risks (Tr. at 817). Applicants recognize that subsidence is a fact of life in mining, and assert that, although it must be seriously considered, it would be addressed when formulating a detailed mining plan after further development work on the property (which cannot be performed until they obtain leases).

Finally, applicants contend that the Judge correctly found that the issuance of leases and the subsequent development on adjacent and virtually identical lands is evidence that a valuable deposit of sodium exists on the applied-for lands. 13/ As noted earlier in this opinion, applicants con-tend that BLM's attempts to distinguish the Wolf Ridge leases from the lands sought by applicants have failed. Applicants argue that the evidence that Wolf Ridge has concluded that solution mining is feasible, that adequate markets exist for the sodium minerals, and that the resource can be extracted and developed at a profit -- all conclusions BLM claims no prudent person would reach -- is also evidence that applicants have discovered a valuable deposit of sodium. Accordingly, applicants conclude that they are entitled to sodium preference right leases.

13/ Applicants recognize that, because Judge Sweitzer found that the Wolf Ridge leases may have been issued in error and that the apparent failure of Wolf Ridge to produce any commercial quantities of sodium from the leases since their issuance in 1971 may indicate that the deposit is not valuable, this factor did not weigh heavily in his decision.

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In an extensive Reply, BLM reiterates arguments it made in its SOR that applicants have failed to prove that they discovered a valuable deposit of sodium in 1966 or today, emphasizing its contention that a presumption of non-marketability has been raised by the failure to produce sodium from the saline zone since 1966. It alleges that applicants' plans are too indefinite and notes that, while the facts discovered by 1966 might justify further exploration, applicants failed to produce sufficient information for a prudent decision to develop the deposit with the reasonable expectation of creating a paying mine. It specifically challenges each argument made by applicants and stresses its position that they have failed to show that solution mining of nahcolite in the Piceance Basin is technically feasible, or that the sodium products can be cost competitive with Wyoming soda ash. It notes that, although applicants state that other companies which looked at their solution mining plan considered it technically feasible, none of them invested in the project. BLM questions why, if solution mining was proven feasible by the Shell test in 1971, applicants waited until they submitted their final showings in 1983 to formally propose the use of that method. It contends that applicants have submitted no evidence concerning costs associated with protection of the oil shale pursuant to the lease terms, and denies their claim that no additional costs will result therefrom. In closing BLM argues that applicants cannot produce the required information because it does not exist at the present time, and therefore the leases must be denied.

In a brief Response, applicants note that they are precluded from conducting any further work on the lands because their prospecting permits expired and they have been unable to obtain the applied-for leases. They note that their situation is distinguishable from that of mining claimants who fail to do development work on their claims, because no presumption of non-marketability can be derived from their failure to develop the lands. Applicants reiterate earlier arguments, stressing what they perceive to be flaws in BLM's interpretation of the evidence and applicable legal standards. They emphasize that they need not prove that a mine would definitely be profitable, but need only show that there was a reasonable prospect that a paying mine might be developed. They contend that they have met this burden. Applicants aver that mine development proceeds in phases, and argue that a prudent person would not commit to financing the complete project at the outset of development. They state that, in spite of what BLM urges, it would be erroneous to base a finding that no valuable deposit has been discovered on this premise. Additionally they reassert that they did not discuss solution mining until they submitted their final showings because they were not required to propose specific, detailed project plans until the 1976 promulgation of the regulations requiring a final showing. They argue that BLM has misrepresented the results of the Shell test, and state that none of the companies reviewing the proposed Rock School project indicated that a decision not to invest in that project was based on concerns about the feasibility of solution mining.

BLM filed a brief Rebuttal.

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BURDEN OF PROOF

[1] We deem it appropriate to commence our discussion by noting the burdens of proof used for the many factual issues presented by this appeal. During the course of the hearing, applicants had both the burden of going forward and the ultimate burden of proof. They were required to show by a preponderance of the evidence that they had discovered a valuable deposit of sodium and that the lands were chiefly valuable for sodium. Applicants carried this burden. Judge Sweitzer determined that applicants "have shown by a preponderance of the evidence that the subject PRLA's contain valuable deposits of sodium and that the lands are chiefly valuable therefor" (Decision at 25-26). An appeal has been filed by BLM challenging Judge Sweitzer's decision. As the appellant in this case, BLM has the burden of demonstrating that his decision is erroneous. See, e.g., Mallon Oil Co., 107 IBLA 150 (1989). It is against this legal backdrop that we will examine the applicable law and issues of fact raised by BLM on appeal.

FINDINGS OF FACTS AND APPLICABLE LAW

[2] The applicants (or their predecessors-in-interest) were granted sodium prospecting permits to facilitate the exploration for commercial deposits of minerals containing sodium. It appears from the record that in 1964 there were no exposures of sodium minerals on the property subject to the prospecting permits, although the existence of saline minerals in the lacustrine rocks of the Green River Formation had been known for a number of years (Exh. 246, Paragraph 1). 14/ An exploration program was commenced pursuant to and under the terms of the prospecting permits. Exploratory holes were drilled on land subject to each of the prospecting permits, and sodium mineralization in the form of nahcolite ($NaHCO_2$) was intercepted in each of the drill holes (Exh. 246, Paragraphs 4, 5, 9 and 16). The nahcolite deposition occurs in four forms: 1) nonbedded crystalline aggregates scattered through oil shale; 2) mappable units of nahcolite crystals disseminated in oil shale; 3) brown microcrystalline beds; and 4) white coarse grained beds (Exh. 246, Paragraphs 16 and 25). The parties further agree that the core drilling intercepted large quantities of nahcolite. The exposure of sodium mineralization in place is not in question, and the parties agree this is the largest known deposit of nahcolite in the world (Exh. 246, Paragraphs 8 and 25).

Section 24 of the Mineral Leasing Act, as amended, 30 U.S.C. § 262 (1982), provides in pertinent part:

> Upon showing to the satisfaction of the Secretary of the Interior that valuable deposits of [sodium] have been discovered by the permittee within the area covered by his permit and that such land is chiefly valuable therefor, the permittee shall be entitled to a lease for any or all of the land embraced in the prospecting permit * * *.

14/ Exhibit No. 246 is a document signed by counsel for the appearing parties stipulating to certain facts which, according to the document, are "true and correct for the purpose of the hearing * * *."

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While the applications now before us were pending, the Department promulgated regulations which were specifically made applicable to pending preference right lease applications. The regulation describing the stan-dard for determining what constitutes a "valuable deposit" and "commercial quantities" is of particular importance to this decision. As then adopted, this regulation states:

> A permittee has discovered *** a valuable deposit of [sodium] if the mineral deposit discovered under the permit is of such character and quantity that a prudent person would be justified in the further expenditure of his labor and means with a reasonable prospect of success in developing a valuable mine. The permittee must present sufficient evidence to show that there is a reasonable expectation that his revenues from the sale of the mineral will exceed his costs of developing the mine, and extracting, removing, and marketing the minerals.

43 CFR 3520.1-1(c) (1976). The regulation was revised in 1984 to read:

> "Valuable deposit" means a mineral occurrence where minerals have been found and the evidence is of such a character that a person of ordinary prudence would be justified in the further expenditure of his/her labor and means, with a reasonable prospect of success, in developing a valuable mine.

43 CFR 3500.0-5(j) (1984) (currently codified at 43 CFR 3500.0-5(i)).

The 1984 regulations also defined "chiefly valuable" as:

> "Chiefly valuable" means a valuable deposit where there is a significant conflict between the extraction of sodium *** and any non-mineral disposition of the lands. Where such extraction conflicts with other disposition, the lands shall be chiefly valuable for sodium * * * extraction if the economic value of the lands for extraction of such minerals exceeds its economic value for any non-mineral disposition.

43 CFR 3500.0-5(k) (1984) (currently codified at 43 CFR 3500.0-5(j)). As previously noted, there is no question that the applicants exposed sodium mineralization within the limits of each of the prospecting permits. What is in question is whether they found a "valuable deposit" as that term is used in 30 U.S.C. § 262 (1982).

The test for determining whether a sodium-prospecting permittee has discovered a valuable deposit warranting issuance of a preference right lease is almost identical to the test for determining whether a mining claimant locating a claim under the 1872 Mining Law (30 U.S.C. § 21 (1982)) has perfected his claim by the discovery of a valuable mineral deposit. See Utah International, Inc. v. Andrus, 488 F. Supp. 962, 968 (D. Utah 1979). Under the 1872 Mining Law, a valuable mineral deposit exists if the mineral found within the limits of the claim is of such quantity and quality that a prudent person would be justified in the further expenditure of his labor

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and means with a reasonable prospect of success in developing a paying mine. United States v. Coleman, 390 U.S. 599, 602 (1968); Chrisman v. Miller, 197 U.S. 313 (1905); Castle v. Womble, 19 L.D. 455, 457 (1894). In addition, the "marketability test" further defines the "prudent person" test by requiring a showing that there is a reasonable prospect that the "valuable mineral" can be extracted, processed, and marketed at a profit. United States v. Coleman, supra. 15/

[3] The "prudent person" test and "marketability" test require a showing that "as a present fact, considering historic price and cost factors and assuming that they will continue, there is a reasonable likelihood of success that a paying mine can be developed." In re Pacific Coast Molybdenum, 75 IBLA 16, 29, 90 I.D. 352, 360 (1983). Actual successful exploitation need not be shown. The applicant need only show that there is a reasonable potential for success. See Barrows v. Hickel, 447 F.2d 80, 82 (9th Cir. 1971). Therefore, the preference right lease applicant is not required to show that mineral of sufficient quantity and quality has been exposed to demonstrate that a profitable mining operation can be developed. The applicant need only show that, based upon the mineralization exposed and reasonable geologic projections, a person of ordinary prudence would expend labor and means with the reasonable expectation that a profitable mine might be developed. Barton v. Morton, 498 F.2d 288 (9th Cir. 1974).

[4] Many times in the life of any mineral property a prudent operator will make basic determinations regarding further operations on the property. Many of the exploration techniques (such as diamond drilling and sinking exploration shafts) are expensive. If, at any time during exploration of a mineral property, it would be prudent to commence development, the initiation of development activities is justified, even though further exploration to expand the limits of the known ore body is warranted. However, if the review leads the prudent person to the conclusion that not enough is known about either the size or quality of the mineralized zone to make a determination that development should commence, further exploration to expand or define the mineralized zone may be called for. The third option, which comes at one time or another for all exploration projects or mines, is to "pull the pumps" and walk away. This decision to abandon the project may come during exploration, after the ore body has been exhausted, and in some

15/ The "prudent person" and "marketability" standards are objective standards. The applicant must prove that a prudent person would expend further time and means to develop a mine--it is not enough that the applicant wishes to do so if the evidence demonstrates that a prudent person would not. United States v. Foresyth, 100 IBLA 185, 209-10 (1987). See Fresh v. Udall, 228 F. Supp. 738 (D. Colo. 1964); United States v. White, 72 I.D. 522 (1965). It is also true, however, that prior failure to develop a mine because of a lack of funding or lack of either develop-ment or marketing expertise should not be the sole basis for determining that a "prudent person" would not invest further time or means to develop the mine. It is assumed that the "prudent person" has the funding and the expertise to properly develop the mine and market the product.

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cases, may be made during the development phase of the mine. 16/ This ultimate choice is always available and seldom easy.

The mineral exploration work on a particular property often exposes mineralization of low quality or a small quantity of high value mineralization. In such cases, reasonable projections based upon the exposed mineral and known geologic conditions may lead to the conclusion that, if more mineral can be exposed, increasing the size of the mineralized body or per-ton value of the contained mineral, it would be possible to have a paying mine. In such cases, the exposed mineralization justifies further exploration. However, it is not sufficient to justify a prudent man finding that there is a reasonable prospect of success in developing a paying mine, and does not establish the discovery of a valuable deposit of a mineral. United States v. Gillette, 104 IBLA 269, 275 (1988); United States v. Franklin, 99 IBLA 120 (1987), and cases cited therein. The Department has previously recognized the difference between "exploration" and "development":

> There is a clear distinction between "exploration" and "development" as they relate to discovery under the mining laws. The separate stages of mining activity serve as a basis for determining what further mining activity a prudent man would be justified in undertaking. Exploration work includes such activities as geophysical or geochemical prospecting, diamond drilling, sinking an exploratory shaft or driving an exploratory adit. It is that work which is done prior to a discovery in an effort to determine whether the land is valuable for minerals. When inherently valuable minerals are found, it is often necessary to do further exploratory work to determine whether a valuable mineral deposit exists, i.e., whether the minerals exist in such quality and quantity that there is a reasonable prospect of success in developing a paying mine.

United States v. Lundy, A-30724 at 5 (June 30, 1967). This does not mean that all diamond drilling, shaft sinking, adit driving, or similar work must always be classified as exploration. If there is "a qualifying discovery of mineral of minable quality and quantity; i.e., 'ore', the 'blocking out' and mapping of the body by drilling and geophysical analysis may properly be regarded as 'development.' United States v. New Mexico Mines, Inc., 3 IBLA 101 (1971)." United States v. Ramsey, 84 IBLA 66, 70 (1984).

Our earlier decision established guidelines applicable to the resolution of this appeal. In that decision we held that the expiration date of the prospecting permits was the crucial point in time for determining

16/ An example of a decision to abandon a project during the development stage immediately comes to mind. After years of work and expenditure of many millions, a number of oil companies abandoned their efforts to mine oil shale. We are aware of no literature which couched the effort to develop an economic process for extraction of shale oil as "exploration" work. The nature and extent of the deposit was known but a process for extraction of the shale oil has never been perfected.

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whether a valuable deposit was discovered. We noted that applicants would be limited to presenting evidence "which demonstrates facts which were in existence prior to the expiration of the prospecting permits or which could reasonably have been anticipated at that time." Yankee Gulch, supra at 357 (emphasis in the original). 17/ To further clarify this limitation we held that:

> if an applicant could reasonably expect that mining technology would be developed within a reasonable period of time so as to make extraction of the mineral profitable, evidence of such reasonably anticipated technological improvement could be introduced to demonstrate that a valuable deposit did exist as of the dates of expiration of the permits. On the other hand, speculation regarding what improvements in mining technology might be developed in the future is not relevant to this determination.

Id. at 357-58.

In light of the constraints placed on applicants, the prudent man determination must be made by using a reasonable estimate of the quantity and quality of the mineralization, using the facts known in 1966. In one way our determination on this issue has been simplified. Like Judge Sweitzer, we will rely upon the stipulated findings of the parties. The drill holes exposed mineralized zones containing 16- to 28-percent nahco-lite with a total thickness ranging from 560 to 912 feet (Exh. 246, Paragraph 23). 18/ A review of the stipulations found in Exhibit 246 and the undisputed testimony regarding the nature and continuity of the deposition also leads to a conclusion that the deposition can be reasonably projected, and the grade and thickness of the deposit will be at or near the range of values set out in Paragraph 23 of Exhibit 246.

[5] If a prudent person could reasonably conclude (based upon the above estimates of the grade and volume of the deposit) that the further expenditure of his labor and means affords a reasonable prospect of success in developing a paying mine, a preference right lease applicant would not need to do further exploration work to obtain a lease, even though further exploration work may be warranted for other purposes. BLM has alleged that further exploration work is needed. However, we find nothing in the record to support a conclusion that BLM is of the opinion that further exploration work may substantially modify the projected quality of the sodium deposit. If there is sufficient knowledge regarding the quality, it would be hard to believe that BLM believes that there is an insufficient quantity of mineralization, when it expresses the quantity in terms of millions of short tons per square mile. This being the case, the determination upon which a final decision must be based is whether there is a sufficient showing that there

17/ By doing so we eliminated the second option discussed above. The applicants no longer had the option of doing additional exploration work. However, as will be seen, this is of little consequence.

18/ The same stipulation also defined the deposit as having between 174 and 489 million short tons of nahcolite per square mile.

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is a reasonable prospect that the sodium deposit can be mined, processed, and marketed at a profit.

This determination must also be made as of the date on which applicants fulfilled all the prerequisites for determining their entitlement to a sodium preference right lease, i.e., at the expiration of their prospecting permits. Cf. United States v. Whittaker (On Reconsideration), 102 IBLA 162, 166 (1988) ("where a patent application is involved and final certificate has been issued, the question of present marketability must be determined by reference to the date on which the claimant fulfilled all the prerequisites to the making of the entry"). Thus evidence concerning costs and market conditions after 1966 have relevance only to the extent they reflect what may reasonably have been anticipated in 1966.

Generally speaking, applicants must also show that the nahcolite can be mined in a manner which will protect the oil shale resources associated with the sodium deposit, i.e., that the costs of protecting the oil shale will not adversely affect the economic viability of the proposed mining operations. Yankee Gulch, supra at 357 and n. 3. This requirement is derived from the restrictions found in the proposed leases. 19/ See Kerr-McGee Corp. v. Hodel, 630 F. Supp. 621, 629 (D.D.C. 1986), vacated as moot and remanded, 840 F.2d 28 (D.C. Cir. 1988) (the cost of compliance with proposed lease terms must be considered in determining whether a prospecting permittee has discovered a valuable deposit).

The relevant terms in the proposed leases provide:

> Definitions. The following definitions shall be used in the interpretation of this lease:
>
> * * * * * * *
>
> (c) "Leased deposits" means (1) all sodium compounds (and any related products thereof) in the Saline Zone not intermingled with oil shale averaging 25 gallons of shale oil or more per ton of rock mined (hereinafter referred to as "25 G.P.T. Oil Shale"), * * * and (2) all sodium compounds (and any related products thereof) within the Saline Zone which are intermingled with 25 G.P.T. Oil Shale and which can be mined, extracted, processed, beneficiated, used, and disposed of without the destructive distillation of the 25 G.P.T. Oil Shale and without significantly changing the composition of the 25 G.P.T. Oil Shale or rendering it more unsuitable in any material respect for development, retorting, processing, use, or disposition. As used herein, the term "related products" shall, in no event, include oil shale.
>
> WITNESSETH:

19/ These oil shale protection terms are identical to those found in the leases issued to Wolf Ridge and others in 1971.

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Sec. 1. Rights of lessee. (a) The lessor, except as otherwise provided in this lease, does hereby grant and lease to the lessee the exclusive right and privilege to mine, extract, process, beneficiate, use, and dispose of all the leased deposits in the Saline Zone in or under the following-described tracts of land, situated in the County of Rio Blanco, State of Colorado: * * *.

(b) Except as expressly provided in subsections 1(c), (d), and (e), the lessee shall not (1) mine, extract, retort, process, use, or dispose of any oil shale, or organic matter or the products thereof contained in or derived from any such oil shale situated above or below the Saline Zone in the above-described tracts of land, (2) mine, extract, retort, process, use, or dispose of any 25 G.P.T. Oil Shale, or organic matter or the prod-ucts thereof contained in or derived from any such 25 G.P.T. Oil Shale, situated in said Saline Zone, or (3) use, remove from the leased premises or dispose of any oil shale, or organic matter or the products thereof contained in or derived from any such oil shale, averaging more than 10 gallons of shale oil per ton from said Saline Zone * * *. It is expressly understood and agreed that the lessee shall not have any right to, and shall not, burn or otherwise use for fuel or energy production purposes, any oil shale situated in or under the lands described in sec. 1(a) hereof.

(c) The lessee shall have the right and privilege (1) to mine and extract oil shale or other material located above the Saline Zone for the sole purpose of emplacing such shafts or other entries as are necessary and are authorized by the Regional Min-ing Supervisor to gain access to the leased deposits for mining, extraction, and removal operations, and (2) to mine, extract and process by non-retorting methods, which are chemical or mechanical and do not require the use of heat, 25 G.P.T. Oil Shale intermingled with the leased deposits, but only to the extent neces-sary for and as an incident to the mining, extraction, processing, beneficiation and removal of the leased deposits, and only so long as in the opinion of the Regional Mining Supervisor, there is no significant extraction or removal of the 25 G.P.T. Oil Shale and the 25 G.P.T. Oil Shale is not by the mining, extraction, processing and beneficiation rendered unfit or significantly lowered in quality for retorting purposes.

(d) The lessee shall have the right and duty to store all 25 G.P.T. Oil Shale which has been mined and all other oil shale which, after mining, has, as a result of processing or beneficiation, become 25 G.P.T. Oil Shale as directed by the Regional Mining Supervisor for its protection and in accordance with secs. 2(1) and 5 of this lease. * * *

(e) In the event that retorting or processing of the leased deposits results in the production of any oil shale whatsoever, all such oil shale shall, anything in this lease to the contrary

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notwithstanding, be and remain the exclusive property of the lessor * * *.

(See Exhs. 222, 223, 224, and 225.)

[6] The Board has full authority to reverse findings of fact made by an Administrative Law Judge. However, when the resolution of disputed facts is influenced by the Judge's findings of credibility, which are in turn based upon the Judge's reaction to the demeanor of the witnesses, and such findings are supported by substantial evidence, they ordinarily will not be disturbed by the Board. The basis for this deference is the fact that the Judge who presides over a hearing has the opportunity to observe the witnesses and is in the best position to judge the weight to be given to conflicting testimony. United States v. McDowell, 56 IBLA 100, 105 (1981), and cases cited therein. See also United States v. Whittaker, 95 IBLA 271, 286 (1987); United States v. Ramsey, 84 IBLA 66, 68 (1984).

There are two aspects of this case which make any resolution of the issues of fact more difficult than they would be in a "normal" case. First, these applications have been pending before BLM for over 20 years. The second is the regulatory revisions resulting in a substantial change in the nature and amount of evidence an applicant must furnish to gain a preference right lease. BLM has required submittal of literally hundreds of pages of documentation that would not have been required in 1966 when the applications were first filed.

Our consideration of whether Judge Sweitzer properly found as a matter of fact that applicants discovered a valuable deposit of sodium focuses on the factual record indicating what was known or reasonably anticipated in 1966 when applicants' prospecting permits expired. As previously noted the parties stipulated to a number of these facts. (See Exh. 246.) Thus there is no dispute that in 1966 applicants had exposed what was projected by both parties as a huge deposit of nahcolite in the lands embraced by their prospecting permits. However, one holding a sodium prospecting permit must show more than the existence of a large deposit of sodium to demonstrate that the deposit is valuable. The party must also show that a prudent person would be justified in expending additional labor and money with the reasonable prospect of success in developing a paying mine.

BLM readily recognized that a single core hole intercept per permit met the standards in place in 1966 (Exh. 203, Appendix II at 2). There can be no question that following the Court's decision in United States v. Coleman, supra, BLM, the courts, and this Board all require much more evidence to satisfy the marketability test than was required in 1966. 20/

20/ It would be easy to say that applicants have been disadvantaged by being required to apply these tough standards to the disclosures resulting from exploratory work conducted in 1966 when the more lenient guidelines applied. Cf. Hiko Bell Mining and Oil Co., 55 IBLA 324 (1981) (coal prospecting permittee made sufficient showing under the standards in effect during the life of the permit, and was allowed to conduct additional

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There is no dispute that conventional room and pillar mining of sodium was known and technically feasible in 1966, and that method could be used to mine nahcolite deposits.

We agree with Judge Sweitzer that applicants have demonstrated that the basic principles of solution mining were known in 1966 and that applicants considered solution mining as an alternative in 1966, even though they did not formally propose its use until 1983. (See Tr. at 83-86, Exh. 239, E-26.) The contention on appeal that Judge Sweitzer erred because the evidence in the record does not support this finding illustrates the problems discussed above. It is true that the initial filings did not mention solution mining. On one hand it is much more difficult to produce evidence regarding one's intent 20 years after the fact than it would be 6 months after the fact. On the other hand, the applicants were not required to submit a laundry list of all of the mining methods they considered feasible in 1966. In 1966 they chose room and pillar mining as the most feasible method. We believe it was, considering the knowledge of mining methods used before that time. 21/ The subsequent regulatory revisions changing the nature and amount of evidence an applicant was to furnish and the subsequent imposition of the lease terms designed to protect the oil shale rendered the 1966 filing inadequate. Subsequent filings made at the insistence of BLM and designed to meet the new regulations included a discussion of solution mining. After review of the record and Judge Sweitzer's opinion, we find that the preponderance of the evidence supports his finding that solution mining was both generally known 22/ and contemplated by applicants in 1966.

Judge Sweitzer found that the 1971 Shell test confirmed the technical feasibility of solution mining the nahcolite deposit. BLM argues that this conclusion is wrong and that vertical solution mining was not proven feasible by the 1971 Shell test. The evidence presented at the hearing can best be summarized as conflicting expert testimony. Judge Sweitzer considered this testimony and the documentary evidence. He obviously considered the weight to be given to the various documents and the testimony of the various experts and evaluated their expertise in the area of solution mining. 23/

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fn. 20 (continued)
drilling after the permit expired to establish a discovery of commercial quantities under the new, more stringent regulations promulgated during the pendency of its lease application).

21/ It is clear from the record that both BLM and applicants envisioned mining and treating dawsonite and oil shale as well as nahcolite in a multi-mineral development when the applications were first submitted in 1966. The proposed lease provisions protecting shale oil were not known until 1971, and applicants did not receive a proposed lease containing those restrictions until 1983.

22/ In fact, testimony by BLM's witnesses regarding the history of solution mining would support this conclusion. See Tr. at 568, 583, 779-80.

23/ On a number of occasions Judge Sweitzer allowed the introduction of evidence and testimony over the objections of counsel, noting that he was doing so, but was taking into consideration the weight that the evidence should be given.

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He determined that the opinions of Beard and Ireson, who had actually been involved with the test, carried greater weight than the testimony of Day, who had no direct experience with the process. In light of Judge Sweitzer's implicit credibility findings which are substantially supported in the record as a whole, we affirm his finding that the Shell test demonstrated the technical feasibility of vertical solution mining of nahcolite. The test was conducted only a few years after the expiration of the prospecting permits, and that fact also confirms his finding that solution mining was reasonably anticipatable in 1966.

Our inquiry into whether Judge Sweitzer properly found conventional and solution mining technically feasible does not answer the question of whether he properly found there to be a reasonable prospect that they were economically feasible, when undertaken in compliance with the lease terms protecting the oil shale. The various arguments and the lease terms have been set forth in some detail above, and we see no reason for restating them now.

We will commence our discussion of this question by addressing the arguments presented by BLM which would appear to foster the position that the restrictive covenants would totally prohibit room and pillar or solution mining, no matter how they are conducted. If BLM's pleadings are properly construed as making this argument, we reject it. It was clearly not BLM's intent to so construe those provisions when they were drafted. As previously noted, those provisions were also incorporated in the Wolf Ridge leases, which were issued on a showing based on room and pillar mining. If BLM's contention were correct, the Wolf Ridge leases could not have been issued. 24/ We also note that BLM's witnesses testified at some length about the proposed solution mining in the Wolf Ridge leases. None of the witnesses gave any indication that BLM believed that solution mining was prohibited on the Wolf Ridge leases, which are subject to the same lease terms as those here proposed. Rather, the testimony was given to demonstrate how BLM believed the Wolf Ridge program to be either more techni-cally sound or cheaper than that proposed by applicants.

Having determined that Judge Sweitzer correctly found that neither room and pillar nor solution mining is totally precluded by the terms of the proposed lease, we will address the issue of whether Judge Sweitzer erred when finding that room and pillar and solution mining were technically and economically feasible when operated under the restrictions imposed by the lease terms. This issue is clearly an issue of fact.

At the hearing applicants' witnesses testified about the mining methods generally and how they planned to apply those methods to the mineralization in place. They readily admitted that the mining plans they proposed were far from accurate in every detail, but generally testified that they were sufficiently confident that the mineral in place could be mined at a profit

24/ The fact that the Wolf Ridge leases contain the restrictive lease terms quoted above strongly indicates that by 1972 BLM was at least preserving the right to prohibit the multi-mineral concept. Otherwise, there would have been little reason for inserting those covenants.

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to clearly warrant further development expenditures. As a whole, the testimony given by the witnesses for BLM was directed to the technical difficulties they expected if either mining method were used. For example, BLM argues that Judge Sweitzer erred because the lease terms prevent conventional room and pillar mining where the oil shale averages 25 G.P.T. or more because such conventional mining would involve the removal of the oil shale as well as the nahcolite. Applicants contend that they can choose the specific zones to be mined and thus avoid 25 G.P.T oil shale. 25/ Similar arguments were advanced for error in Judge Sweitzer's determination for solution mining. For example, BLM argues that applicants' solution mining plan (which envisions using heated water) will result in destructive distillation of the oil shale. Ireson's uncontradicted testimony indicates that oil shale begins to retort at about 300 degrees Fahrenheit, but that at this temperature conversion occurs at an extremely slow rate (measured in months) (Tr. at 235). Judge Sweitzer recognized that this slow conversion occurred at or near the upper temperature limits proposed by applicants, and concluded that, to the extent that this conversion might take place, it did not significantly affect the oil shale. 26/

There is no question that a great deal of work must be done to refine either of the mining plans proposed by applicants. For example, in order
to determine which horizon or location would achieve the best returns while complying with the lease terms, applicants will probably be required to do additional drilling. However, drilling for this purpose more readily fits under the category of development work necessary to finalize a mining plan than it does under exploration work. As previously noted, it is doubtful that any additional drilling will materially change the present estimates of either the quantity or the quality of the mineralization on the properties. Likewise, the exact method for solution mining is unknown. Further work

25/ Additionally, we note that Sec. 1. (c) (2) of the proposed leases provides that a lessee can mine, extract, and process by non-retorting methods, which are chemical or mechanical and do not require the use of heat, 25 G.P.T. oil shale intermingled with the sodium to the extent necessary for and incidental to the mining of the sodium, as long as the Mining Supervisor determines that there is no significant extraction of the oil shale and that the mined oil shale is not rendered unfit or of significantly lower quality for retorting purposes.

26/ The following example illustrates what we perceive to be one of the more troubling aspects of the case presented by BLM. On one hand BLM's witness asserted that oil shale would be endangered by the proposed solu-tion mining because the maximum diameter of the cavity proposed by applicants (175 feet) would not support the overlying oil shale. He reasoned that having a cavity of this size would result in fracturing, creating communication between the dry saline zone and the wet leached zone above
it, and subsidence, causing ground water and mining problems. On cross examination he admitted that a smaller diameter hole would definitely lessen this potential danger. However, the next preceding witness had testified at great length that he considered it impossible to create a 175-foot-diameter cavity in the property by solution mining.

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must be done to determine the optimum temperature for extraction of nahcolite while preserving the oil shale. Solution flow rates and patterns must be developed for optimum recovery while protecting against contamination and subsidence. However, the work applicants must perform in order to develop a specific mining plan is development work and not exploration work. See United States v. Ramsey, supra at 70.

At this point in the development of the proposed mining processes, no party can say with certainty whether either proposed mining plan will result in a degradation or enhancement of the value of the shale oil contained in the oil shale. If one examines the evidence and testimony on this point alone, one can find evidence presented by both applicants' and BLM witnesses on both sides of this issue. The record clearly gives a basis for finding the additional requirements imposed by BLM will have an adverse effect on the mining programs contemplated by applicants, i.e., the mine could be operated at a lower cost and with higher recoveries without these restrictions. Judge Sweitzer also considered these facts, weighed the evidence, including the expert testimony, and concluded that the record supported applicants' position that, after considering these factors, further expenditure of time and money on mine development was and is justified. 27/

[7] A question remains as to whether, in 1966, it was reasonable to expect that applicants would be able to profitably market these products given the mining and production costs. In making this determination, it is not necessary to show the exact cost of production or the exact price which might be received based upon actual cost and sales figures. Rather, it may be based upon a reasonable and rational estimate of the cost of production and a reasonable and rational estimate of the market price for the product. See United States v. Foresyth, 100 IBLA 185, 227, 94 I.D. 453, 477 (1987). There was no dispute that markets for sodium products that may be produced from nahcolite existed in 1966, and continue to exist today. (See Decision at 16-17; Tr. at 917.)

Witnesses for applicants testified about the products which could be produced from nahcolite and the method for doing so. There appears to be no dispute that the technology necessary to render the mined product suitable

27/ Although it might be said that Judge Sweitzer erred in concluding that no evidence was adduced to indicate how, if at all, either method would be adversely affected economically because of the co-existence of the oil shale reserves, after our review of the record that was before him when he wrote his opinion, we understand this statement. BLM presented no evidence which would allow one to reasonably quantify either the reduction in production or the increase in cost resulting from the imposition of the terms. All of BLM's witnesses gave a lengthy description of a potential problem with some aspect of a proposed mining plan, followed by a cursory statement that, because of this problem, there was not a discovery. On the other hand, applicants' witness established a potential sales price of $300 per ton (Tr. at 434). With an anticipated cost of $175 per ton, there certainly is room for absorbing additional costs.

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for sale was known in 1966. 28/ No "black box" process was proposed, and in fact, the processes appear to be surprisingly simple. The vast preponderance of the evidence indicates that the main competitive advantage would be that, once mined, the nahcolite could be processed into a marketable product at a lower cost than that incurred by manufacturers of the same products who use other raw materials. In fact the only material issue seems to be the size of the potential market.

In 1966 applicants included information concerning the costs of mining and producing soda ash from nahcolite, shale oil from oil shale, and alumina from dawsonite as part of their preference right lease applications. These submissions were based on the assumption that applicants would be permitted to process all the minerals in the saline zone. Judge Sweitzer found the Survey determinations that applicants had discovered a valuable deposit of sodium did not totally support a finding that the deposit is valuable, because the Survey decisions were based on multi-mineral development and did not consider the necessary economic data on mining costs (Decision at 19). However, those submissions were considered by him for other purposes, provide information regarding the 1966 costs of producing soda ash from nahcolite mined by conventional means, and indicate a reasonable expectation in 1966 that there was a market for soda ash. See Exh. 86 at 10-19. He also found that there was an established and growing market for soda ash in 1966. The evidence supports that conclusion (Exh. M, Aug. 22, 1967, memorandum at 15). The soda ash industry has expanded from 3 million to 11 million tons per year since 1966 (Tr. at 103; Decision at 22-23). He also concluded that subsequent independent studies substantiated the reasonableness of applicants' expectations of profitable marketing (Decision at 23). The record contains ample support for that conclusion. Although BLM contends that the Survey (Exh. 239, E-26) (cited by Judge Sweitzer as an example of the evidence substantiating applicants' profitability claims)
is based on unsupported assumptions about the cost of raw nahcolite and contains disclaimers, BLM has provided no contrary cost information to rebut the data contained therein, nor has it posited any reason why the Survey, which was conducted for the Department of Energy, would be based on unsupportable assumptions. We find Judge Sweitzer's conclusion that there was a reasonable expectation of profitably marketing the products developed from the sodium deposits in 1966 is amply supported by evidence in the record.

[8] At the hearing and in its posthearing briefs BLM argued that the data submitted by applicants was not sufficiently specific to form the basis for any assurance that a paying mine could be developed. It continues that argument on appeal. Applicants counter by noting that it would be both impossible and imprudent to make the commitment proposed by BLM without further development of both the mineralization and the mining processes. They correctly note that they have been precluded from doing any additional work which might have resulted in more specific proposals, and that they will

28/ The one exception to this statement was cellular glass production. However, applicants placed very little emphasis on this potential market, and the conclusions reached by Judge Sweitzer are fully supportable without considering it.

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continue to be precluded from doing so until a lease is issued. 29/ We find it patently unfair to fault the applicants for failing to conform to standards of proof not in existence at the time various documents were filed when the more stringent standards were developed during the pendency of their applications. The applications they submitted were adequate when they were filed, and when all of the filings and other documents filed by applicants are considered, they have submitted sufficient data upon which to base a determination that a valuable deposit of sodium has been discovered by the permittees within the area of the various prospecting permits. 30/

The vast majority of the information in the documents of record about the costs of development and product prices is based on conditions existing after 1966. This evidence is relevant to the extent it reflects upon the reasonableness of a 1966 decision to proceed with development. In their final showings (Exhs. 186A and 186B), and the exhibits submitted with them (Exh. 239, B-3), applicants presented extensive and detailed cost and price data to support their contention that nahcolite can be mined and the products manufactured from nahcolite can be marketed at a profit. Applicants submitted additional marketing data in response to BLM's technical review of the applications. (See Exh. 215.) Additional marketing data (see, e.g., Exh. 239, C-1 Exh.55) and evidence on marketability were presented through Kane's testimony at the hearing. BLM attempts to rebut this mass of supporting evidence by pointing to what it perceives to be flaws in the submissions, but presents no contrary cost and price estimates. For example, BLM points to MMC's asserted repudiation of its own study in a letter addressing the draft supplemental EIS for BLM's proto-type oil shale leas-ing program. However, the subject being addressed in that letter was not the feasibility of a sodium-only mine, and the entire comment quoted by BLM does not unequivocally state that a sodium-only mine would be unprofitable. Rather, MMC states its opinion that a sodium-only project would not be as economical as a multi-mineral development. 31/

BLM's challenges to the reliability of the marketing information using solution mining stem from its assertion that vertical solution mining is not technically feasible and, thus, marketing assumptions based on that process have no validity. We have already upheld the Judge's conclusion that some form of vertical solution mining similar to that proposed by applicants is technically feasible. Thus BLM's arguments have no acceptable foundation.

29/ While testifying about his prior experience, one of BLM's expert witnesses described a potash mine in which many millions were spent trying various mining methods before the technically and economically feasible one was developed. That mine then successfully ran for a number of years. It was clear from his testimony that this mine method development did not take place during the period when the miner was operating under a prospecting permit.

30/ We note that the current regulations governing sodium preference right lease applications are less stringent than those under which these applications have been adjudicated. See 43 CFR 3523.1-2.

31/ The record also contains information demonstrating that MMC had interests adverse to those of applicants. (See Exhs. R-BB.)

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While it is true that during the course of development applicants will be required to modify and further refine the vertical solution mining plan they submitted, there is no evidence that the anticipated modifications are so major that they would negate applicants' cost and sales price estimates or render them meaningless. As previously noted, the information concerning the anticipated costs and returns need not be exact. To support a prudent person determination there need only be a reasonable prospect of success in developing a valuable mine. United States v. Foresyth, supra.

BLM argues that Judge Sweitzer erred because there is no credible evidence that applicants would be able to enter existing markets. Kane testified that, not only do markets exist for the sodium products from applicants' land, but that applicants would be able to penetrate those markets. Although BLM has attempted to discredit this testimony, we will defer to Judge Sweitzer's determination regarding the credibility of this witness and the relative weight given to his testimony and other evidence on the marketability issue. See, e.g., United States v. McDowell, supra.

Both BLM and applicants claim the development on the Wolf Ridge leases supports their conflicting positions regarding marketability of the sodium deposits. We agree with Judge Sweitzer's finding that the work on the Wolf Ridge leases is some evidence that a prudent person would develop the sodium deposits on applicants' lands. However, we note that Judge Sweitzer did not rely solely on this factor. Ignoring the Wolf Ridge leases, we find sufficient support in the record to affirm the Judge's decision. Further, although, as BLM argues, we have held that a presumption that a deposit is not valuable arises when there has been little or no development of the deposit over a long time, that presumption is not applicable when, as here, applicants have been precluded from conducting any work on the deposit. United States v. Parker, 82 IBLA 344, 361, 91 I.D. 271, 281 (1984). 32/

Throughout their SOR, BLM acknowledges the correctness of Judge Sweitzer's finding that applicants need not prove with absolute certainty that a paying mine will result. It would appear, however, that BLM sought a level of proof nearly this high as a part of applicants' final proof documentation. It rejected those applications because applicants' information was not sufficiently specific to give BLM the assurance it sought. Judge Sweitzer properly held that applicants need only prove that there is sufficient mineralization to cause a prudent person to expend further time and money with a reasonable expectation that a profitable mine will be developed. BLM has failed to prove that he erred when concluding that applicants' submissions establish that a prudent person would expend additional labor and means with a reasonable prospect of success in developing a paying mine. Our review of the record and transcript has made it very apparent that Judge Sweitzer thoroughly reviewed the massive record and the testimony of all the witnesses before reaching his conclusions. He carefully weighed all the evidence, and our independent review of the entire record leaves little doubt that the factual determinations made by him are amply supported.

32/ See also fn. 15.

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The only evidence in the record concerning whether the land is chiefly valuable for sodium demonstrates that the non-mineral use of the land is minimal. (See Exh. 86 at 19.) Therefore, the Judge correctly concluded that the land embraced by the applications is chiefly valuable for sodium.

Without further belaboring this decision with additional references to and discussion of BLM's contentions regarding errors of fact and law, except to the extent they have been expressly or impliedly addressed in this decision, they are rejected on the ground that they are, in whole or in part, contrary to the facts and law or are immaterial. National Labor Relations Board v. Sharples Chemicals, Inc., 209 F.2d 645, 652 (6th Cir. 1954).

Accordingly, pursuant to the authority delegated to the Board of Land Appeals by the Secretary of the Interior, 43 CFR 4.1, Judge Sweitzer's decision is affirmed.

R. W. Mullen
Administrative Judge

I concur:

Charles B. Cates
Director, Ex Officio Member

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November 12, 1987

YANKEE GULCH JOINT VENTURE, NIELSON RESOURCES CORPORATION, HOGLE INVESTMENT COMPANY, EDWARD N. JUHAN, BARBARA JEAN JUHAN HUNTER, JOSEPH PAUL JUHAN, and MULTI-MINERAL CORPORATION Appellants[1] v. BUREAU OF LAND MANAGEMENT, Respondent	: : : : : : : : : : : : : : :	COLORADO 0118328, 0118329, and 0120057 IBLA 84-626 Appeal from decision of the Colorado State Office, Bureau of Land Management, rejecting sodium preference right lease applications.

DECISION

Appearances: Morris B. Hoffman, Esq., Mosley, Wells, Johnson & Ruttum, Denver, Colorado, for appellants;

Lowell L. Madsen, Esq., Office of the Regional Solicitor, U.S. Department of the Interior, Denver, Colorado, for the respondent.

Before: Administrative Law Judge Sweitzer.

By opinion dated January 22, 1985, the Interior Board of Land Appeals (Board) referred this matter to the Hearings Division for hearing and decision as to whether or not the

[1]Yankee Gulch Joint Venture is the current applicant for lease applications C-0118328 and C-0118329. Yankee Gulch is comprised of John Dunn (13.34%); Multi-Mineral Corporation (47.08%); and, Natrona Resources, Inc., (39.58%). Natrona Resources, Inc., was formerly Nielson Resources Corporation. The current applicants for C-0120057 are Natrona Resources, Inc., (25%); Hogle Investment Company (25%);

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appellants are entitled to sodium preference right leases pursuant to the provisions of Section 24 of the Mineral Leasing Act of February 25, 1920, as amended, 30 U.S.C. § 262, and the Department's regulations issued pursuant thereto. Yankee Gulch Joint Venture, et al., 84 IBLA 353 (1985). Appellants seek to reverse a decision of the Colorado State Office, Bureau of Land Management (BLM), dated March 13, 1984, rejecting their sodium preference right lease applications (PRLA's), C-0118328, C-0118329, and C-0120057 for approximately 7,100 acres of land within the Piceance Creek Basin, Rio Blanco County, Colorado.

A pre-hearing conference was held on the record November 4, 1985, at Denver, Colorado, pursuant to which appellants and respondent submitted a lengthy written stipulation of facts (reproduced as Exh. 246). A hearing was held July 28, 29, 30, 31 and August 1 and 4, 1986, at Denver, Colorado. The parties have submitted extensive post-hearing briefs, the last being received January 2, 1987. Extensive transcript corrections were submitted as well, by appellants on October 27, 1986, and by respondent on January 12, 1987. See Order dated March 2, 1987. Thereafter several "missing" exhibits were located by the parties and forwarded to this office, and the extraordinarily voluminous exhibit 239 was reviewed to ascertain its completeness. (Exh. 239 is the entire administrative record pertaining to the three subject PRLA's. See Tr. 5-12.) The record was deemed finally complete and the case ready for decision as of June 12, 1987. See Joint Letter dated May 27, 1987.

Background

Irvin Nielson, a geologist, worked on an oil shale project in the Parachute Creek area of Colorado for Union Oil Company from 1954 to 1958 (Tr. 32-33). During that time he also worked on a Master's Thesis on the geology of the

[1](continued)
Edward N. Juhan (16.66%); Barbara Jean Juhan Hunter (16.66%); and, Joseph Paul Juhan (16.66%). Any reference to "applicants" or "appellants" herein includes these entities and their predecessors in interest. Each of the applicants is represented in this proceeding by Mr. Hoffman and his firm except Multi-Mineral Corporation which, although notified of these proceedings, was neither present nor represented at the hearing and submitted no brief. See Exh. 244; Appellants' Opening Post-Trial Brief at 3; Pre-hearing Tr. 10, 11-12; Tr. 3-4, 13, 34, 35.

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Piceance Basin (Tr. 36). When Union Oil closed down its oil shale project in 1958, Mr. Nielson stayed in the area and went into the business of core drilling (Tr. 33).

Between 1959 and 1964, 11 core holes were drilled in the northern part of the Piceance Basin. These core holes exposed large quantities of nahcolite and halite in the Parachute Creek Member of the Green River Formation, comingled with oil shale. Exh. 246, P3.

Early in 1964, Mr. Nielson drilled a core hole for Marathon Oil Company in the Piceance Basin, Rio Blanco County, Colorado, just south of the subject PRLA's C-0118328 and C-0118329 (Tr. 37-39, 109; Exh. 226). He detected a significant amount of sodium bicarbonate in the core hole and advised Marathon to file for a sodium lease, which they did (Tr. 37). Marathon's permits were C-0118322 and C-0118323. See, e.g., Exh. 239, Memorandum dated May 18, 1964, from Regional Mining Supervisor to Chief, Branch of Mining Operations, (one of several miscellaneous clasped papers in an accordion folder marked "2401-06a, C-0118326, Multi Mineral Corp, Correspondence-General, #2"). He also asked Marathon's permission to advise other of his clients to file for sodium permits in other nearby areas not of interest to Marathon, and Marathon consented (Tr. 39).

Mr. Nielson did so advise several of his clients, friends and relatives, and through his efforts 11 or 12 sodium prospecting permit applications were filed (Tr. 39-40). On January 23, 1964, Oluf Nielson filed sodium prospecting permit applications C-0118326 and C-0118327, Irvin Nielson himself filed sodium prospecting permit applications C-0118328 and C-0118329, and John B. Tweedy filed sodium prospecting permit application C-0118333. On February 10, 1964, John E. Dunn filed sodium prospecting permit applications C-0119985 and C-0119986. On February 14, 1964, Joe T. Juhan filed sodium prospecting permit application C-0120057. These eight permits were all located in T's. 1 and 2 S., R's. 97, 98 and 99 W., 6th P.M., Rio Blanco County, Colorado. Wolf Joint Venture, et al., A-30978 (May 2, 1968), 75 I.D. 137 (1968); Kaiser Aluminum and Chemical Corporation, et al., A-30982 (May 3, 1968). These permit applications were all approved and permits issued. Id. and Tr. 40-41. The other applications were denied because they conflicted with certain oil shale lease applications (Tr. 40, 110-111).

Between 1964 and 1966, seven exploratory wells were drilled in the Piceance Basin on lands for which these sodium prospecting permits had issued. Mr. Nielson himself drilled

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core hole 4-1 on C-0120057 during October or November of 1964 (Tr. 43; Exh. 226). Kaiser Aluminum drilled core holes 20-1 and 17-1 on C-0118329 and C-0118328, respectively, during the winter of 1965-1966 (Tr. 45-46; Exh. 226). Mr. Nielson made arrangements to have core holes drilled on the other four permit areas (Tr. 46, 47-51; Exh. 226). All seven wells exposed large quantities of nahcolite, halite and dawsonite. The applicants herein either drilled or otherwise had access to the results of all seven core holes.[2] Exh. 246, P4, P5. Appellants and respondent agree that "the deposit of nahcolite in the Piceance Basin [is] the largest known deposit of this mineral in the world." Exh. 246, P25. It is calculated that it contains some 32 billion short tons of nahcolite. Id.

Timely applications for sodium preference right leases were filed in April 1966 for all eight permit areas: C-0118326 by Wolf Joint Venture; C-0118327 by Oluf Nielson and John W. Savage; C-0118328 and C-0118329 by Kaiser Aluminum and Chemical Corporation, and Yankee Gulch Joint Venture; C-0118333 by The Oil Shale Corporation (TOSCO); C-0119985 by Rock School Joint Venture; C-0119986 by Ridge Minerals Venture; and, C-0120057 by Joe T. Juhan and S. Scott Nicholls. Wolf Joint Venture, supra; Kaiser Aluminum, supra. By Memorandum dated May 3, 1966, the State Director advised the Director BLM that pursuant to "your memorandum of August 18, 1964 (3150 (722b)), actions on these [PRLA's] are being deferred pending your advice." Copies of the three subject and four Wolf Joint Venture applications accompanied the missive (Exh. 239: A-2).

Although all eight PRLA's presented common issues (compare Wolf Joint Venture, supra, at 5-7 with Kaiser Aluminum, supra, at 3), the PRLA's were, for some reason, split into two consolidated groups of four applications. Wolf Joint Venture considered C-0118326, C-0118327, C-0119985 and C-0119986. These four lease applications all were filed April 28, 1966, and the United States Geological Survey (USGS) treated them together in its assessment. See Exh. M: Memorandum from Regional Mining Supervisor dated August 25, 1967, and Memorandum from Director, Geological Survey, to Director, BLM, dated August 31, 1967. Kaiser Aluminum considered C-0118328, C-0118329, C-0118333 and C-0120057.

[2]Mr. Nielson was a co-founder of the Wolf Joint Venture, and he served as its vice-president and operating manager from 1966 to 1968. During that time, he was involved in preparing the data submitted in support of its PRLA's (Tr. 67-68, 90, 99).

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These four were also treated together by USGS. See Exh. 86: Memorandum from Regional Mining Supervisor dated January 7, 1970. Each of the applicants for these eight PRLA's was offered an opportunity to request a hearing in order to address the questions raised by the decisions and to demonstrate an entitlement to the preference leases.
Apparently all eight applications were consolidated for hearing, and pre-hearing conferences were held August 13, 1968 and May 20, 1969, in Denver, Colorado. Then,

> Shortly after the second pre-hearing conference, [counsel for respondent] received a telephone call from the Solicitor's Office in Washington, D.C., during which [he] was told to send to that office all of the files relating to the sodium leases * * *. This was done that same day * * *. No transmittal memorandum was prepared because the caller from the Solicitor's Office advised [counsel for respondent] that none would be needed.

Exh. 159. No hearing was ever held (Tr. 123-124). "The hearing ordered in Wolf never took place because of a subsequent satisfactory showing by the applicants and an agreement between them and Government officials obviating the necessity for a fact-finding procedure. See Wolf Joint Venture A-30978 (Supp.) (June 30, 1971)." Peter I. Wold, Western Standard Corporation, 13 IBLA 63, 80 I.D. 623, 625 n.2 (1973).

The supplemental decision issued by a new Solicitor, Mitchell Melich, advised the four Wolf Joint Venture lease applicants that if they would withdraw their request for hearing, give up any mining claims they had in the area, and agree to certain limitations in the lease, sodium preference right leases could issue to them. Wolf Joint Venture, et al., A-30978 (Supp.) (June 30, 1971).

Within the week, the four PRLA's identified in Wolf Joint Venture were approved, and leases issued for C-0118326, C-0118327, C-0119985 and C-0119986 on July 6, 1971, (Exhs. 222, 223, 224 and 225). Mr. Nielson presumes he learned of these leases the day they issued (Tr. 90). He and other applicants for the four PRLA's identified in Kaiser Aluminum then met with the Solicitor in July or August 1971 to ask for leases to issue on the same terms as the Wolf Joint Venture leases (Tr. 90-91).

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By letter dated September 27, 1971, the Solicitor inquired of D. J. Dufford (attorney for Yankee Gulch Joint Venture, see Tr. 92) whether Yankee Gulch would accept leases for C-0118328 and C-0118329 on the same terms as the lease issued July 6, 1971, to Wolf Joint Venture for C-0118326, "in the event that it is determined that [Yankee Gulch] has fulfilled the statutory requirements for issuance to them of sodium preference right leases * * *" (Exh. 96). By letter dated April 28, 1972, James H. Smith replied on behalf of Yankee Gulch that it would accept those terms and he requested the leases be issued (Exh. 98).

By letter dated July 26, 1972, the Solicitor inquired of Joe Juhan and Scott Nicholls if they would accept a lease for C-0120057 on the same terms as the lease issued to Ridge Minerals Venture for C-0119986 on July 6, 1971, "in the event it is determined that [they] have fulfilled the statutory requirements for issuance to [them] of a sodium preference right lease * * *" (Exh. 105). There is no record of a response, but a joint letter dated June 20, 1977, from Edward Juhan to then-Secretary Cecil Andrus and BLM State Director Dale Andrus seems to assume an affirmative reply was given (See Exh. 239: D-54).[3]

By memorandum dated May 23, 1972, the Solicitor's Office referred the Yankee Gulch PRLA's (C-0118328 and C-0118329) and the TOSCO PRLA (C-0118333) to the Director, BLM, for further action. The memo suggested that these applications could be treated in the same manner as the Wolf Joint Venture applications had been treated (Tr. 96; Exh. 100).

Although the Solicitor had not required any environmental assessment of the Wolf Joint Venture leases prior to issuance of the leases, the Director did require an environmental assessment of the Kaiser Aluminum lease areas. An environmental analysis (EA) was prepared, dated July 14, 1972, but it was determined to be inadequate. See Exh. 239: A-1, Memorandum from Director to State Director dated August 17, 1972. (The July 14 report is missing from the files.)

A letter dated August 28, 1972, from the Chief, Division of Technical Services, to appellants indicates that C-0120057 was also referred to BLM for further action:

[3]D-54 is Exhibit 54 to "Applicant's Statement of Facts and Memorandum of Law," which is reproduced as Exh. 171. Exh. D-54 is not reproduced therein, however, but may be found as part of Exh. 239 in a black binder marked "D" and "Exhibits 1-78."

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> Our Washington Office has returned sodium preference-right lease applications C-0118328, C-0118329, C-0118333 [4] and C-0120057, directing us to make a complete environmental analysis prior to further action.

BLM therefore asked appellants to furnish certain additional information, including their proposed mining operations, to allow it to complete the environmental analysis of the impact of issuance of leases (Exh. 239: D-46).

A subsequent EA dated April 25, 1973, was returned to the District Manager by Chief, Division of Resources to be "beefed up." The revised EA, dated October 15, 1973, was still under consideration in May 1976 (Exh. 239: A-1).

By letter dated June 23, 1976, BLM requested still more information, in accordance with the newly amended regulations applicable to preference right lease applications: 43 CFR 3521.1-1(b) (1976), 41 FR 18848 (May 7, 1976) (Exh. 239: D-51). The regulations required certain information, concerning, inter alia, the quantity and quality of the minerals discovered and the proposed mining operations, which information constitutes an "initial showing," to be submitted with lease applications.
A July 8, 1976, Memorandum from Chief, Division of Technical Services, transmits the four PRLA's to the Regional Solicitor pursuant to his request. A July 9, 1976, memorandum from the Regional Solicitor transmits the files to the Assistant Solicitor, Minerals, Division of Energy and Resources, Washington, D.C., pursuant to his request. The PRLA's were subsequently returned to the State Director, together with a memorandum from the Director dated August 24, 1976, urging that they be processed expeditiously (Exh. 239: A-2).

On June 27 and July 5, 1977, appellants submitted numerous additional documents (constituting their "initial showing" in support of their lease applications. Two years after the applicants submitted their "initial showings," by memorandum dated August 13, 1979, the Acting Conservation Manager, Central Region, advised the State Director that the deemed the information submitted by the applicants "sufficient to

[4]The TOSCO lease application C-0118333 plays no significant part in this proceeding. It was relinquished in 1982. Exh. 239: B-2 at 4.

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satisfy the first showing requirements as directed under 43 CFR 3521.1-1(b)" (Exh. 239: D-72). He recommended "that action be initiated for final showing as required under 43 CFR 3521.1-1(c)." Id.

By Memorandum dated June 12, 1981, the State Director advised the Director:

> All four of these sodium PRLAs have met "initial showing" pursuant to 43 CFR 3520. The next phase in processing these PRLAs to conclusion is to complete the Technical Examination/Environmental Assessments (TE/EA) and hold a public hearing.
>
> * * * * * * *
>
> The District cannot start to prepare a TE/EA this fiscal year without significantly impacting other priority AWP accomplishments.

Exh. 239: A-1.

By memorandum dated January 19, 1982, the Conservation Manager, Central Region, again advised the State Director that the information submitted in the applicants' initial showings had been reviewed and that:

> The review indicates valuable deposits of sodium, have been discovered on the subject PRLA's and the lands are chiefly valuable for sodium. A final determination will be made following review of the Final Showing and the Environmental Assessment. The Environmental Assessment will include costs attached to reasonable mitigation and reclamation of the anticipated operations and disturbed areas.

Exh. 167.

Subsequently a draft TE/EA was prepared (See Exh. 239: A-1 part 2), a public hearing was held, the State Director made a preliminary determination to issue the leases, and a preliminary finding of no significant impact was published. By letters dated February 17, 1983, the applicants were officially advised that their initial showings were approved and that final showings were now to be submitted (See 43 CFR 3521.1-1(c) and (d) (1979)). Proposed leases accompanied the notifications (Exh. 239: A-1, A-3).

The purpose of the final showing was to provide detailed information regarding estimated revenues and estimated costs

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a prudent person would consider before deciding to develop a mine, including the costs of developing the mine, removing the mineral, the processing necessary to place the mineral in a salable condition, transporting the mineral product to point of sale, applicable royalties and taxes, and complying with existing governmental regulations, reclamation requirements, and proposed lease terms. The regulations also required the filing of a comparison of estimated costs and estimated revenues.

The regulations in effect at the time also included the following section:

> Amount of detail required. The information submitted by the permittee shall be sufficient to enable the authorized officer to ascertain whether the permittee's showing has a reasonable factual basis and support his [lease application] * * *.

43 CFR 3521.1-1(e) (1979).

Final showings were submitted in April 1983 (Tr. 342; Exhs. 186-A, 186-B).
In a Technical Review (of the Final Showings) dated July 22, 1983 (Exh. 203), BLM, which had by then assumed the functions of MMS,[5] concluded that the land involved herein did not contain valuable deposits of sodium because there was not a sufficient showing that the sodium could be mined, extracted, removed, and marketed at a profit. BLM based this conclusion in part on its determination that, under the proposed lease, the structural integrity of the oil shale deposit must be preserved, and that the applicants had not demonstrated that such structural integrity could be maintained at a cost which would permit the marketing of the sodium in competition with other established suppliers. On December 2, 1983, appellants submitted a detailed response to
BLM's technical review and additional evidence in support of their lease applications (Exh. 215).

By decision dated March 13, 1984, the BLM rejected the preference right lease applications. The decision stated:

[5]Onshore mineral management functions of the Minerals Management Service (including those of the Mining Supervisor under the Leasing Act regulations) were transferred to the Bureau of Land Management by Secretarial Order 3087, December 3, 1982.

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> For the reasons more fully elaborated in our report of July 22, 1982, [the Technical Review] it is our conclusion that you have failed to provide information to give us reasonable assurances that your development plans will allow economic extraction of the sodium deposits without damage to the oil shale resources in accordance with the provisions of the proposed lease. It is not enough to claim that no damage will occur. It is the obligation of the applicant to submit reasonable factual evidence that this can be done. In the absence of such evidence, the BLM has no choice but to deny lease issuance. It is not the purpose to issue preference right leases for research projects designed to test the feasibility of unusual mining or processing scenarios or to determine whether mined products can be processed to meet requirements of speculative markets.

Exh. 239: E-19.

The decision concluded that it was not necessary to address the "chiefly valuable" issue: "One cannot logically address 'chiefly valuable' if the question of 'value' itself has not been adequately addressed given the proposed terms of the lease which require protection of the oil shale resource." Id.

Issues

The issues to be decided are (1) whether or not a valuable deposit of sodium has been discovered within the physical and temporal limits of the permitted areas and, if so, (2) whether the land is chiefly valuable therefor. Yankee Gulch, supra, 84 IBLA at 357, 358.

Questions of fact identified by the Board as bearing on the decision of the first issue include:

a. Can the sodium be extracted, removed and marketed at a profit without adversely affecting the surrounding oil shale resources? Yankee Gulch at 357.

b. Is there a demand for nahcolite as an agent for removing sulfur dioxide from the gaseous emissions of industrial plants? Id.

c. Were facts known, or could facts now known have been reasonably anticipated, prior to the expiration of the

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prospecting to show that there is a valuable deposit of sodium and that the lands are chiefly valuable therefor? Id.

d. To what extent, if any, does the issuance of sodium leases for adjacent lands indicate the presence of a valuable deposit? Yankee Gulch at 358.
e. To what extent, if any, are prior determinations by USGS relevant to deciding whether nor not valuable deposits are present. Id.

These questions are explored in reverse order below in the section titled "Discussion." The examination of question "a" above is subsumed in the discussion of the other questions.

Burden of Proof

Appellants in this proceeding bear the burden of establishing by a preponderance of the evidence that they discovered a valuable deposit of sodium and that the subject lands are chiefly valuable for sodium. Yankee Gulch, supra, 84 IBLA at 358; Tr. 4; accord, 43 CFR 3523.4(c) (1986), 51 FR 15228 (April 22, 1986); see also 5 U.S.C. § 556(d).

Applicable Law

Section 24 of the Mineral Leasing Act of February 25, 1920, as amended, 30 U.S.C. § 262, provides in pertinent part:

> Upon showing to the satisfaction of the Secretary of the Interior that valuable deposits of [sodium] have been discovered by the permittee within the area covered by his permit and that such land is chiefly valuable therefor, the permittee shall be entitled to a lease for any or all of the land embraced in the prospecting permit * * *.

The regulations in effect when the appellants herein applied for preference right leases provided in pertinent part:

> A permittee who discovers valuable sodium deposits in the land before the [sodium prospecting] permit expires is entitled to a preference right lease of all or part of the lands in the permit * * *. An application for a preference right lease must * * * specify fully the extent and mode of

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> occurrence of the [sodium] deposits as disclosed by the prospecting work, and show that valuable sodium deposits were discovered before the permit expired.

43 CFR 3152.5(a) (1965), 29 FR 4534 (March 31, 1964).

In 1976, while appellants' PLRA's were still pending approval, new regulations issued that, for the first time with respect to sodium leases, articulated standards by which to determine the existence of a "valuable deposit" of sodium. See 43 CFR 3520.1-1(c) (1976), 41 FR 18847 (May 7, 1976). These new regulations were specifically made applicable to all applications pending on the date they took effect. 43 CFR 3520.1-1(d) (1976); John S. Wold, Eugene V. Simmons, 48 IBLA 106, 111-112 (1980); accord, Natural Resources Defense Council v. Berklund, 609 F.2d 553, 556 and n.11 (D.C. Cir. 1979).

The pertinent regulation read:

> Standards to determine "valuable deposit" and "commercial quantities." A permittee has discovered commercial quantities of coal or a valuable deposit of [sodium] if the mineral deposit discovered under the permit is of such a character and quantity that a prudent person would be justified in the further expenditure of his labor and means with a reasonable prospect of success in developing a valuable mine. The permittee must present sufficient evidence to show that there is a reasonable expectation that his revenues from the sale of the mineral will exceed his costs of developing the mine, and extracting, removing, and marketing the minerals.

43 CFR 3520.1-1(c) (1976).

This regulation was in effect until revised eight years later. See 43 CFR 3520.1-1(c) (1983); cf. 49 FR 17892, 17900 (April 25, 1984).

The revised regulation read:

> "Valuable deposit" means a mineral occurrence where minerals have been found and the evidence is of such a character that a person of ordinary prudence would be justified in the further expenditure of his/her labor and means, with a

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reasonable prospect of success, in developing a valuable mine.
43 CFR 3500.0-5(j) (1984).

The preamble to the 1984 notice of final rulemaking explained the change in definition:

> Twenty-three comments were directed to the term "valuable deposit." Some comments expressed the view that the definition used in the proposed rulemaking was too general and should be tightened, while other comments expressed the view that while the definition appeared to be patterned after the "prudent man" test or standard, the proposed definition was too stringent. In addition, the comments expressed concern about that part of the definition in the proposed rulemaking which stated that the criteria for success were not the same as that required for patenting a mining claim. These comments have been given careful consideration and the final rulemaking has revised the term so that it conforms to the "prudent man" test. Under this test, which has been upheld by the Supreme Court, a valuable deposit is defined as "(W)here minerals have been found and the evidence is of such character that a person of ordinary, prudence would be justified in the further expenditure of his labor and means with a reasonable prospect of success, in developing a valuable mine * * * (Castle v. Womble, 19 L.D. 455, 457 (1894)). The final rulemaking reflects not only the Department of the Interior's long-held view concerning the appropriate definition of the term "valuable deposit," but also eliminates the language of the proposed rulemaking that implied that the Department required a demonstrated certainty of a valuable mine before issuing a patent on a mining claim.
>
> Some comments objected to the elimination by the proposed rulemaking of the requirement in the current regulations that permittees must provide sufficient evidence of a reasonable expectation that the revenues from the sale of the mineral would exceed the costs of developing the mine and extracting, removing and marketing the mineral. This requirement is not necessary because the official responsible for this decision has ample

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> authority to request from individual applicants the evidence needed to show whether or not discovery of a valuable deposit has been made.

49 FR 17892, 17892-17893 (April 25, 1984) (emphasis added).

The 1984 revisions also set forth in the regulations, for the first time with respect to sodium leases, a definition of "chiefly valuable."

> "Chiefly valuable" means a valuable deposit where there is no significant conflict between the extraction of sodium, sulphur or potassium and any non-mineral disposition of the lands. Where such extraction conflicts with other disposition, the lands shall be deemed chiefly valuable for sodium, sulphur or potassium extraction if the economic value of the lands for extraction of such minerals exceeds its economic value for any non-mineral disposition.

43 CFR 3500.0-5(k) (1984).

The preamble to the notice of final rulemaking explained the definition.

> The eight comments directed to the term "chiefly valuable" in the proposed rulemaking requested clarification of the proposed definition in the final rulemaking. * * * The final rulemaking deletes from the definition any value comparisons between sodium, sulphur or potassium or other minerals contained within the area covered by the lease. The chiefly valuable comparison in the final rulemaking, instead, compares values only between sodium, sulphur or potassium and non-mineral dispositions of the lands. The justification for this change rests on a careful review of the legislative history of the Mineral Leasing Act of 1920 and the various court decisions and Departmental opinions interpreting the term "chiefly valuable" as it is used in the Act and in other mineral disposition statutes. That review concludes that Congress, in enacting the Mineral Leasing Act, adopted a well known phrase from the public land laws and that the Secretary of the Interior, in promulgating regulations containing a definition of the term, would be guided by court and Departmental decision construing the phrase in other statutes. None of these court decisions or

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> Departmental opinions expressly limits the comparison to the respective values of the minerals. Rather, the term "chiefly valuable" has been interpreted to require a comparison of the value of the lands for the specific mineral with the value of the lands for other non-mineral disposition. Mineral value comparisons which are conducted for purposes related to conservation of the mineral resources subject to these regulations will continue to be conducted.
>
> * * * The term "chiefly valuable" is an antiquated term which was included in the law at a time when the United States was classifying lands as agricultural for disposal. Its use was primarily for determining the relative value of a given tract so that the lands could be disposed of pursuant to the correct statute.

49 FR 17892, 17893 (April 25, 1984). See, e.g., 43 CFR 2430.6 (1986).

Thus, the test for determining whether a sodium prospecting permittee has discovered a valuable deposit sufficient to warrant the issuance of a preference right lease is (and has been) the same as the test for determining whether a mining claimant has perfected his claim by the discovery of a valuable mineral. See Utah International, Inc., v. Andrus, 488 F.Supp. 962, 968 (D.C. Utah 1979); Atlas Corporation, A-30617, A-30677, 74 I.D. 76, 80-81 (1967); Elizabeth B. Archer, et al., v. Bureau of Land Management, Idaho 3715, etc., (April 30, 1985) (Recommended Decision of Judge Mesch) (final decision still pending, IBLA 81-319, 81-320). Satisfaction of the test requires the exposure of valuable mineralization of such quantity and quality that a person of ordinary prudence would be justified in the further expenditure of efforts and means in the reasonable expectation of developing a profitable mine. Chrisman v. Miller, 197 U.S. 313 (1905); Castle v. Womble, 19 L.D. 455 (1894). This so-called "prudent man test" has been further refined by the so-called "marketability test," which requires that the value of the mineral deposits exceed the costs of extracting, processing, transporting and marketing those deposits. United States v. Coleman, 390 U.S. 599 (1968); United States v. Albert Martinez, et al., 49 IBLA 360, 87 I.D. 386 (1980). The test, however, does not require proof positive that the mineral deposit is profitable at the

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present (or any particular) point in time;[6] it requires only a reasonable expectation that a profitable mine can be developed. Converse v. Udall, 399 F.2d 616 (9th Cir. 1968), cert. denied 393 U.S. 1025 (1969); In re Pacific Coast Molybdenum Co., 75 IBLA 16, 90 I.D. 352 (1983).

The correct test for determining whether the lands for which a sodium prospecting permittee claims a preference right lease are "chiefly valuable" therefor involves a comparison between mineral and non-mineral values for disposition. 43 CFR 3500.0-5(k) (1984). There is no valid authority for predicating a determination of "chiefly valuable" on a comparison of mineral values vs. other mineral values. 49 FR 17892, 17893 (April 25, 1984).

Discussion

There is no dispute that sodium (nahcolite) has been exposed (via core holes) on each of the subject PRLA's prior to the expiration of their antecedent sodium prospecting permits, and that the extent of the sodium deposit uncovered is enormous and that the quality of the mineralization is quite good. Nor is there any dispute now that markets exist and may be developed for sodium products that may be produced from the deposit. As counsel for respondent acknowledged in his closing argument

> The Applicants have shown that there's a large deposit of sodium in the Piceance Basic [sic]. They've shown that the lands covered by the

[6]I do note that the Ninth Circuit Court of Appeals held in Ideal Basic Industries, Inc., v. Morton that, in order to satisfy the marketability test, a claimant must show that the mineral "presently could be extracted and marketed at a profit." Id. 542 F.2d 1364, 1369 (9th Cir. 1976) (emphasis in original). This holding retains its vitality today with respect to non-precious minerals such as sodium. See Lara v. Secretary of the Interior, 820 F.2d 1535, 1541 (9th Cir. 1987). Nevertheless, "'[p]resent marketability' has never encompassed the examination of either cost or price factors as of a specific, finite moment of time * * *. Rather, the question of whether something is 'presently marketable at a profit' simply means [one] must show that, as a present fact, * * * there is a reasonable likelihood of success that a paying mine can be developed." In re Pacific Coast Molybdenum, 75 IBLA 16, 90 I.D. 352, 360 (1983) (emphasis added).

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> preference right lease applications contain sodium deposits. What they haven't shown, Your Honor, is that -- and I would add they've also shown that the industry today uses sodium products that can be manufactured from these deposits. But what they haven't shown is that the deposits found on their preference right lease lands or lease application lands can be mined, removed, and marketed at a profit. [Tr. 917]

The key question in this case is whether or not the applicants can develop a profitable mine. The complexity of the case stems from the coexistence of large quantities of oil shale in the same lands covered by the appellants' sodium PRLA's. The sodium (saline zone) underlies the richest oil shale zones and the sodium is also disseminated within the oil shale. Although both oil shale and sodium are leasable minerals, a lease for one conveys no rights to the other. No leases for the oil shale in these lands have yet been authorized, and any lease for the sodium deposits here will rightfully require the preservation of the oil shale deposits. See Mining Claims -- Rights to Leasable Minerals, Solicitor's Opinion, 75 I.D. 397 (1968).

a. Prior USGS determinations

The USGS has determined on three separate occasions that the subject PRLA's contain valuable deposits of sodium (Exhs. 84, 86, 167). As a matter of law, these prior determinations are not binding upon the Department. See Utah International, Inc. v. Andrus, 488 F.Supp. 962, 967 (D.C. Utah 1979) and Utah International, Inc. v. Andrus, 488 F. Supp. 976, 981 (D.C. Colo. 1979). On this both appellants and respondent agree. Appellants' Brief at 45; Respondent's Brief at 21.[7] Nevertheless, as a matter of fact, the findings of USGS on three separate occasions that the lands contain valuable deposits of sodium does have some bearing on determining whether or not as a matter of fact the subject lands do contain valuable deposits of sodium.

The first determination that the permitted areas contain valuable deposits of sodium appears in a Memorandum from the Regional Mining Supervisor to the Chief, Conservation Division, dated July 27, 1967 (Exh. 84). Its date and content suggest that it was prepared in the normal course of

[7]Appellants' Brief is styled "Appellants' Opening Post-Trial Brief;" respondent's Brief is styled "Answer."

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business; it predates the Solicitor's opinion in Kaiser Aluminum by almost a year:

> No. 2: One hole was drilled on the land in each of the two [8] sodium applications, and valuable deposits of sodium were discovered during the term of the permits.

Exh. 84 at 2.

The second determination that the permitted areas contain valuable sodium deposits appears in a Memorandum from the Regional Mining Supervisor to the Chief, Conservation Division, dated January 7, 1970. It concerns all three of the subject PRLA's and likewise finds:

> The applicants for preference right sodium leases covered in this report have complied with the requirements of 43 CFR 3152.5 [1969] by the timely submission of data which shows that valuable deposits were discovered on the land before the permits expired.

Exh. 86 at 19.

Both of these determinations were made by J. Paul Storrs (Tr. 385, 390; Exhs. 84, 86). Mr. Storrs was the Regional Mining Supervisor from about 1964 to 1979 (Tr. 381). During the 5 years prior to his tenure as Regional Mining Supervisor he served as a mining engineer and then Deputy Mining Supervisor (Tr. 381).

The second determination was made at the request of the State Director, BLM, about a year and a half prior to the Solicitor's supplemental opinion in Wolf Joint Venture (Tr. 391; Exh. 86). For the second evaluation, a lot more information was considered and the evaluation methods were more precise (Tr. 392). Mr. Storrs testified further that he was familiar with the "prudent man" test and that, in his opinion, these PRLA's satisfied that test (Tr. 396-400).

Even though Mr. Storrs indicated that, in his opinion, a prudent man would proceed with these PRLA's, his determination that the PRLA's contain valuable deposits may have

[8] This memorandum concerns only C-0118328 and C-0118329. No comparable determination appears in the files concerning C-0120057.

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been predicated on an erroneous standard: his determinations may have failed to take into consideration the "marketability test" approved as a refinement of the "prudent man" test by United States v. Coleman, 390 U.S. 599 (1968). Compare the marketability test requirements with Mr. Storrs' description of the "prudent man" test at Tr. 396 and with the explanation of the test for discovery of a valuable deposit of sodium set forth in Solicitor Melich's July 6, 1971, letter to Senator Jackson (Exh. M):

> (b) Factors such as production costs, marketing costs and markets are not relevant to a determination under the Mineral Leasing Act whether a valuable deposit has been discovered. The proper test, with respect to sodium, is whether sodium is present in commercial quantity and quality. [Id. at 5]

The third determination is indicated in a Memorandum from the Conservation Manager, Central Region, to the Colorado State Director dated January 19, 1982 (Exh. 167). The determination was based on a review of information supplied in the applicants' initial showing.

According to Mr. Phillip Cloues, Chief of the Economic Evaluation Section, BLM, the initial showing is, inter alia, for the purpose of showing the existence of a mineral deposit (Tr. 854; 43 CFR 3520.1-1(b) (1982)). It is left to the final showing to demonstrate, by addressing all the applicable economic factors, that the deposit is valuable (Tr. 854; 43 CFR 3520.1-1(c) (1982)).

I must conclude that the prior USGS determinations do indeed evidence the existence of a deposit, but they do not evidence that the deposit is valuable. They have not been predicated upon and have not fully considered the necessary economic data on costs of mining and producing sodium products from these deposits.

b. Adjacent Sodium Leases.

In July 1971 sodium preference right leases were issued for the Wolf Joint Venture PRLA's: C-0118326, C-0118327, C-0119985 and C-0119986 (Exhs. 222, 223, 224 and 225). These PRLA's are in the same area as the subject PRLA's. They were "discovered" by the same persons (Mr. Nielson, et al.). They share the same geology (See generally Tr. 37-52, 59-60; Exhs. 226, 227, 228 and 239: B-3, exh. 12).

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As a matter of law, the issuance of these leases to the Wolf Joint Venture applicants imposes no duty on the Department to issue leases to the appellants herein. Ideal Basic Industries, Inc. v. Morton, 542 F.2d 1364, 1367-68 (9th Cir. 1976); Kerr-McGee Corp. v. Hodel, 630 F.Supp. 621; 629-630 (D.D.C. 1986) appeal docketed, Nos. 86-5492, 86-5532 (D.C. Cir. July 15, 1986). It may be that the Wolf Joint Venture leases were issued in error. The record here does not show on what basis those PRLA's were determined to contain valuable deposits of sodium and to be chiefly valuable therefor.

As a matter of fact, there is evidence in the record to show that the information provided to the Department, and the Department's analysis and conclusions predicated thereupon, was substantially similar for the Wolf Joint Venture PRLA's and the Kaiser Aluminum PRLA's. Compare the Memorandum from Regional Mining Supervisor to Chief, Conservation Division, dated August 25, 1967, (Exh. M) regarding the Wolf Joint Venture PRLA's with Memorandum from Regional Mining Supervisor to Chief, Conservation Division, dated January 7, 1970, (Exh. 86) regarding the Kaiser Aluminum PRLA's. Also compare the 1970 Technical Report on the Wolf Joint Venture PRLA's (Exh. 239: D-45) with the draft 1972 TE/EA on the Kaiser Aluminum PRLA's (Exh. 239: A-2 [folder 1 of 2, pp. BLM 0104-BLM 0060] and A-3 [folder 1 of 2]).

The mineral assay values and other geological data reported for the Wolf Joint Venture PRLA's can, of course, be used as geologic inference to bolster and flesh out the finding on the Kaiser Aluminum PRLA's because actual exposures of mineral (sodium) have been made on the subject lands. Furthermore, the substantial investments of efforts and means made by Wolf Joint Venture and its successors is some indication that a person of ordinary prudence might be justified in investing additional efforts and means in the reasonable expectation of developing a paying mine. And yet the failure of the Wolf Joint Venture leases to produce any significant sodium product after more than 15 years' development may also indicate that a valuable sodium deposit may not exist there. United States v. Zweifel, 508 F.2d 1150, 1156 n.5 (10th Cir. 1975) and cases cited therein.[9]

On balance, I believe the issuance of and subsequent development on the Wolf Joint Venture leases provides some

[9]It must be noted, however, that the Wolf Joint Venture lease holders have continually worked to develop their lease holdings in contrast to the Zweifel case where no attempts at development were made. See, e.g., Exh. 247.

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evidence in favor of finding that a valuable deposit of sodium exists on the subject PRLA's.

c. Evidence known prior to permit expiration.

1. Quantity and quality.

As has already been noted, core holes were drilled on each of the subject PRLA's and on each of the Wolf Joint Venture PRLA's prior to the expiration of their antecedent prospecting permits. Each core hole exposed sodium (nahcolite, dawsonite, halite) of significant quality and quantity. The parties have stipulated that the sodium deposit underlying these PRLA's is the largest deposit (of nahcolite) in the world (Exh. 246, P25).

2. Mining technology.

Mr. Nielson asserts that solution mining was considered as a possible mining method from the very beginning.

> Q. [by Mr. Hoffman] * * * What sort of mining plan or proposal did you have in mind in 1966 when you filed these preference right lease applications on Yankee Gulch?
>
> A. [by Mr. Nielson] We were interested in doing solution mining on the properties.
>
> * * * * * * *
>
> Q. Now in 1966 did you have a particular mining plan prepared and in mind?
>
> A. In a new deposit like this there were lots of different concepts on how to recover the resources. In 1964 when we first cored the Juhan hole, Joe Juhan and I met with a man named O. A. Powers of Pocatello, Idaho, who was the vice-president of FMC Corporation. * * *
>
> * * * * * * *
>
> Q. Nahcolite is pure naturally occurring sodium bicarbonate, is that right?
>
> A. That's correct. * * * [I]n 1964 we proposed to O. A. Powers that we solution mine nahcolite --
>
> Q. Okay.

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A. -- on the Juhan property and at that time they were interested. They had done solution mining in Wyoming on trona.

Tr. 83-86.

No particular mining method was indicated in the lease applications (Exhs. 5, 6). As of 1970 the Department reports that "[t]he applicants propose to mine by room and pillar, block caving, open-cut, shrinkage stope or a combination of methods based on costs and recoveries" (Exh. 86 at 5). "It was indicated that room and pillar methods would be used." Id. at 6. Corroboration of Mr. Nielson's testimony, however, can be found in a confidential report prepared by Heinrichs Geoexploration Company, dated June 12, 1967, and submitted to the Department in support of the Juhan PRLA C-0120057 (See Tr. 126). "Of all the mining methods that could be used,
selective room and pillar, blockcabe [sic], in situ - solution, and open cut, the latter is preferable." Exh. 239: E-26, Heinrichs' report at 2 (emphasis added).

Thus, it appears that in situ solution mining was contemplated, in addition to room and pillar mining and other methods, prior to the expiration of the permits. The Shell test in 1970-1972 served to confirm the technical feasibility of solution mining the nahcolite deposits (both bedded and disseminated).Absolutely no technical problems were encountered during the leaching phase of the test (Tr. 248, 250, 283, 297).

3. Marketability.

Rough cost/price studies submitted to the Department with the lease applications indicated the expectation of marketing products developed from the sodium deposits at a profit. See Exh. 86, pp. 10-19. There was an established and growing market for soda ash present in 1966. See Exh. M: Memorandum from Regional Mining Supervisor to Chief, Conservation Division, dated August 22, 1967, at p.15. The soda ash industry has expanded from 3 million to 11 million

[10]The Shell test was conducted on lands adjacent to the subject PRLA's (Exh. 226) to ascertain the practicality of in situ recovery of oil shale (See "Soluble-Salt Process for In-Situ Recovery of Hydrocarbons From Oil Shale," Exhs. 230, 239: E-1). The first step of the process involved the leaching of the nahcolite to expose the kerogen bearing oil shale for in situ recovery (See generally Tr. 225-250).

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tons per year since 1966 (Tr. 103). There was also the reasonable expectation of developing a new market for nahcolite as a flue gas desulfurization reagent. Mr. Nielson became familiar with the concept of using sodium bicarbonate (nahcolite) for that purpose circa 1965 (Tr. 103-105).

Subsequent independent studies have substantiated the reasonableness of appellants' expectations of marketability at a profit:

Estimated Nahcolite Production Costs

	Cost in Millions of Dollars					20-yr
Item	1978	1983	1988	1993	1997	Average
Investment and Working Capital	32.9	35.4	38.2	41.2	43.7	38.1
Annual Costs						
Operation and Maintenance	3.6	5.5	8.6	13.5	19.5	9.4
Administration and General	1.6	2.2	3.1	4.6	6.4	3.4
Raw Materials	3.5	5.7	9.1	14.7	21.5	10.0
Royalties	1.3	1.9	2.6	3.7	4.8	2.7
Fixed Costs and Depletion	9.3	12.0	15.8	21.0	36.6	16.3
Income Taxes	7.1	10.8	15.4	21.4	27.1	18.7
Freight	12.3	15.7	20.1	25.6	31.1	20.4
Total Annual Cost	38.7	53.8	74.7	104.5	147.0	80.9
Nahcolite Production Cost, $/ton	17.0	24.0	33.0	47.0	66.0	36.0
Comparable Soda Ash Production Cost, $/ton	48.0	70.0	97.0	135.0	178.0	105.0

Exh. 239: E-21, Division of Industrial Energy Conservation, U.S. Department of Energy, IDO/1683-1, Dawsonite and Nahcolite Survey (Farris and Mains, 1978) at 43 (footnote omitted).

4. Additional costs of preserving oil shale.

The two principal methods proposed by appellants for mining the nahcolite resources within their PRLA's are room and pillar and in situ solution. Both are technically feasible. No evidence has been adduced to indicate how, if at all, either method would be adversely affected economically because of the co-existence of oil shale reserves.

The room and pillar process involves the removal of material from the ground for processing on the surface. The ore is crushed to separate the oil shale from the nahcolite, which may then be further processed. The oil shale is set aside and stored on the surface or replaced in the mine as a backfill to prevent subsidence. There is no significant adverse affect to the oil shale; nor is there any significant cost to preserving the oil shale. See Exh. 239: E-26 at pp. 36-43.

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The in situ process involves the injection of warm water under pressure to dissolve the nahcolite. The preferred method is patented (by Beard et al.) and based on the Shell tests.[11] The oil shale is not dissolved, but is left in the ground. See Exh. 239: E-26 at 52-60.

It must be noted that the Beard process contemplates leaching the nahcolite deposits with water at a temperature of 400 degrees+/-, at which temperature it is expected that a cavity would produce approximately 750 tons of nahcolite per day. Id. at 57. Oil shale begins to retort and convert to shale oil (albeit at an extremely slow rate) at temperatures as low as 300 degrees (Tr. 235). The Shell test produced only about 4 1/2 tons of nahcolite per day at a temperature of 250 degrees-260 degrees (Tr. 244-245).

d. Demand for Nahcolite.

It is acknowledged by both parties that there is at present no demand or market for nahcolite as a reagent for removing sulfur dioxide from the gaseous emissions of industrial plants. Appellants' Brief at 43; Respondent's Brief at 83. Industry has expressed an interest in using nahcolite for such a purpose (Exh. 239: C-1 at exhs. 58-67 and C-2 at exhs. 58-67). Pilot tests have shown great promise, indicating that the use of nahcolite as a "dry scrub" is potentially very practical and economical (See Tr. 441-456; Exhs. 186-A at 82, 186-B at 80, 237, 238, 248). No plant currently uses nahcolite as a scrub because (1) nahcolite is not currently available in commercial quantities and (2) because of potential problems in disposing of the spent reagent (Exh. 239: C-1 at exh. 64, C-2 at exh. 64, D-53). The disposal problem may subsequently have been solved (See Exh. 248).

Conclusion

A sodium prospecting permit may only be issued to prospect on public lands not already "known to contain" a valuable deposit of sodium. 30 U.S.C. § 262. If lands are "known to contain" valuable deposits of sodium, prospecting permits may not be issued therefor; such lands may only be leased on a competitive basis. A determination by the Government that lands are "known to contain" a valuable deposit of sodium is analogous to a determination that the land is "mineral in character" or that it is part of a "known geologic structure," and such a determination may be made based upon

[11] A copy of the patent is contained in Exh. 239: E-1.

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geologic inference alone. See Atlas Corporation, A-30617, A-30677, 74 I.D. 76, 84 (1967).

With hindsight, it appears evident that respondent erred in issuing the subject sodium prospecting permits. BLM should have determined (or, at least, could have determined) prior to 1964 that the Piceance Basin is "known to contain" a valuable deposit of sodium (nahcolite). See, e.g., Dana's System of Mineralogy, Vol. II at 135 (7th Ed. 1951). Had respondent determined that the Piceance Basin was "known to contain" valuable deposits of sodium, a prospecting permit would have been not only unnecessary but also statutorily prohibited.

Even though respondent had not determined that the Piceance Basin is known to contain a valuable deposit of sodium, it had determined that the area was known to contain a valuable deposit of oil shale. See, e.g., Withdrawal of Oil Shale Lands, 53 I.D. 127 (1930). Such lands were closed thereby to sodium prospecting and leasing until five years later. Oil Shale Withdrawal Modified To Allow Sodium Prospecting Permits and Leases, 55 I.D. 280 (1935). Even then, inasmuch as the issuance of a sodium prospecting permit is discretionary, the Government could have exercised its discretion and postponed the issuance of any prospecting permits until it had determined a policy regarding the development of the oil shale deposit and a policy regarding the development of sodium minerals that might also be found there.

Instead, the Government issued the prospecting permits and thereby became irrevocably committed to issuing sodium preference right leases to these applicants, provided that they can show "to the satisfaction of the Secretary of the Interior that valuable deposits of [sodium] have been discovered * * * and that such land is chiefly valuable therefor * * *." 30 U.S.C. § 262.

Even though the die was cast in 1964, and the applicants were entitled by statute to a preference lease upon the proper showing, these applications have progressed at a snail's pace from one procedural irregularity to another and from one delay to another. One can only speculate that internal policy struggles were the cause. Neverthless, barring an act of Congress, the "policy" could not be changed.

As the Solicitor explained to Senator Jackson in a letter dated July 6, 1971:

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In 1964, of course, the Department knew that lands embraced within these permits contained extensive oil shale deposits. The time when application was made for these prospecting permits was the proper time for the Department to exercise its discretion and to resolve the policy question8 of whether issuance of sodium leases in these oil shale lands was in the public interest. The decision of the Department in this regard was to issue the prospecting permits. The Department thereby committed itself to issue sodium leases in oil shale lands when, and if, the holders of the permits complied with the requirements of 30 U.S.C. § 262. * * *

It therefore is not correct to say, as have some, that the Department now faces a major policy question of whether to issue sodium leases for these lands. That policy question was answered in the affirmative in 1964, and the law does not provide any method whereby the Department can now reverse or change that decision.

Exh. M (emphasis in original).

Nevertheless policy considerations probably did play a large role in the Department's treatment of the lease applications. It is interesting to note, for example, that in 1971, when the definition of "chiefly valuable" was thought (incorrectly) to mean value in relation to all other mineral as well as non-mineral uses, the Department issued leases to the Wolf Joint Venture applicants based (in part) on a determination that the land was chiefly valuable for sodium because the lease was limited to the sodium bearing strata (saline zone).

Conversely, the March 13, 1984, decision denying leases to these applicants asserts that the applicants were required to submit "evidence [to demonstrate] that a mineral deposit exists on the land that can be mined and processed by existing methods, and sold at a profit into existing markets" in order to qualify for issuance of leases. Exh. 239: E-19 (emphasis added).

The decision rests on, and incorporates therein by reference, a conclusory technical review that repeatedly (and erroneously) asserts that the "marketability test" is based on economic value at the present time. See Exh. 203 at 8, 10 and Appendix II, 5, 6.

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This clearly is incorrect. The marketability test requires a showing that at the present time there is a reasonable likelihood of success in developing a profitable mine. In re Pacific Coast Molybdnenum, 75 IBLA 16, 90 I.D. 352, 360 (1983).[12]

> A valuable mineral deposit exists if the mineral found within the limits of the claim is of such quantity and quality that a prudent person would be justified in the further expenditure of his labor and means with a reasonable prospect of success in developing a paying mine. United States v. Coleman, 390 U.S. 599, 602 (1968); Chrisman v. Miller, 197 U.S. 313 (1905); Castle v. Womble, 19 L.D. 455, 457 (1894). This "prudent man" test has been refined to require a showing that "as a present fact, considering historic price and cost factors and assuming that they will continue, there is a reasonable likelihood of success that a paying mine can be developed." In re Pacific Coast Molybdenum, 75 IBLA 16, 29, 90 I.D. 352, 360 (1983). However, actual successful exploitation need not be shown -- only the reasonable potential for it. Barrows v. Hickel, 447 F.2d 80, 82 (9th Cir. 1971). The question is not whether a profitable mining operation can be demonstrated, but whether, under the circumstances and based upon the mineralization exposed, a person of ordinary prudence would expend substantial sums with the reasonable expectation that a profitable mine might be developed. Barton v. Morton, 498 F.2d 288 (9th Cir. 1974).

United States v. Jerry E. Franklin, 99 IBLA 120, 124 (1987) (emphasis added).

Likewise, in referring this case for hearing, the Board held:

> The standard for judging whether a valuable deposit has been discovered permits consideration of evidence which leads to a "reasonable expectation" that the mineral can be mined, extracted, removed, and marketed at a profit. 43 CFR 3520.1-1(c). Thus, for instance, if an applicant could reasonably expect that mining technology

[12]See also n.6 supra.

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> would be developed within a reasonable period of time so as to make extraction of the mineral profitable, evidence of such reasonably anticipated technological improvement could be introduced to demonstrate that a valuable deposit did exist as of the dates of expiration of the permits.

Yankee Gulch, 84 IBLA at 357-358.

In addition, the technical review applies the "too much" (or excess reserves) rule: the rationale that when an existing market is fully supplied new resources have no value. Exh. 203, Appendix II at 5, 6, 7. "[T]here is no basis to support the too much rule." Baker v. United States, 613 F.2d 224, 225 (9th Cir. 1980). The technical review also asserts that the issuance of leases pursuant to these PRLA's "would not be in the public interest." Exh. 203, Appendix II at 7. Considerations of the public interest are precluded at this stage. If the lands contain a "valuable deposit" of sodium and are "chiefly valuable" therefor, the appellants are entitled to preference right leases. 30 U.S.C. § 262.

Thus, it no longer matters whether respondent erred in issuing the subject prospecting permits, nor does it matter what the Department's policy toward the development of sodium and oil shale "ought" to be, nor does it matter what the applicants' motives might be in applying for these sodium leases. The only two issues relevant to this proceeding are (1) do the lands contain "valuable deposits" of sodium and, if so, (2) are the lands "chiefly valuable" therefor?

I find that the appellants have submitted a wealth of information which, when taken together, indicates that both conventional room and pillar and in situ solution mining techniques are technically and economically feasible methods to conduct a nahcolite-only mine on the subject PRLA lands, and that the deposit is presently marketable (See, e.g., Exhs. 206, 215, 239: B-5, B-6). The information submitted is sufficient to support a finding that a person of ordinary prudence would be justified in the further expenditure of substantial efforts and means in the reasonable expectation of developing a profitable nahcolite-only mine. Respondent has not submitted evidence sufficient to overcome appellants' showing, nor even to place the issues in equipoise.

I therefore find that the appellants have shown by a preponderance of the evidence that the subject PRLA's contain

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valuable deposits of sodium and that the lands are chiefly valuable therefor. The appellants are entitled therefore to sodium preference right leases for the subject lands. 30 U.S.C. § 262.

Harvey C. Sweitzer
Administrative Law Judge

APPEAL INFORMATION:

Any party adversely affected by this decision has the right to appeal to the Interior Board of Land Appeals. The appeal must comply strictly with the regulations in 43 CFR Part 4 (See enclosed information pertaining to appeals procedures).

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